

Internet Resources And Forensic Science - 2008

Reddy G.V.N., Ramesh Babu A., Chebrolu S., M.Malleswari M., Ogirala S.A.S., Md. Ali Yousuf

Department of Forensic Medicine, NRI Medical College, Chinakakani, Guntur District. A.P.

Abstract

The Internet is a never-ending fountain of information for people in relation to Forensic Science in this techno-savvy world. The number of people using Internet have increased in massive proportions since its inception in 1969 and expected to improve 100% in near future. This review provides readers with a host of information for the use of Internet as a way to enlighten them self with knowledge pertaining to Forensic Science. We have gone through various sites in Internet and gathered information which will be helpful for a Medico-legal person, lest for a Forensic expert. This article is of unique nature because of the inclusion of Indian Forensic Science related web sites. The sites featured here were thoroughly searched in view of its potentiality, utility, credibility and accountability in regard to Forensic Science and modalities. We believe, this overview will play a major role in stimulating Forensic Scientist, Medico-legal experts or any other Law-related professionals in usage of web for teaching, training and research.

Key words: Internet, World Wide Web, Forensic science and Impact of the Web and its limitations

Introduction

The Internet is never ending fountain of information for people in relation to Forensic science in this techno-savvy world. There has been an exponential increase in the amount of information available through the web over recent years. This increase has been matched by an increase in the number of individuals using Internet in day-to-day life. With on and around 320 million pages available¹, the Internet has had an influence on every day life. The numbers of people using Internet have been increasing since the last few years. In UK, an estimated 15 million users of web are seen second only to none other than USA². Even though Internet has been plagued for commercial benefits, it still remains as a powerful instrument for exchange of scientific knowledge³. This establishment of World Wide Web (WWW) has paved way for the enthusiastic people to learn and distribute the knowledge in their own words. The Internet

is literally serving as a life-line for different communities in various disciplines of research areas. With just a click of the mouse, any information related to any field can be accessed in few seconds; with the use of World Wide Web (WWW), additional features like web camera etc. can be used for instant recording and sending videos. Hundreds of hours spent in searching information in books in a library can be done in a second. Internet has improved lifestyle in an unimaginable manner.

The birth of Internet occurred in 1969 when ARPANET (Advanced Research Projects Agency Net) was commissioned. This led to a great increase in the growth of NET and the number of users started is doubled in three months. In Mid 1993, there were a total of 130 web sites in the world; right now they run into millions. As per estimates in 2004, the number of web users would be closed to a billion; 280 million English and 657 million non-English speaking people⁴. National Science Foundation Network (NSFNET) replaced the ARPANET in 1990. Computer science department in the Massachusetts Institute of Technology developed WWW in 1989 jointly with the European centre for Practice research as a Standard user interface⁵.

Reprint Requests: Dr. G.V.N. Reddy
Professor & Head
Department of Forensic Medicine
NRI Medical College, Chinakakani
Guntur Distric, A.P.
E-mail: dr.gvnreddy@yahoo.com

World wide web (www)

The Internet is a massive, worldwide network of interconnected computers. It comprises of several communication media, one being WWW. It is a graphical interface to sites all over the world containing pictures, sound, and videos. WWW is Internet's most exciting development because of its user - friendly interface. Based on the use of hypertext (a fragment of text that refers to information else where that can be accessed with a mouse click), web pages are written in the Hyper Text Mark-up Language (HTML), which is sent through hypertext transfer protocol (http). WWW has many web sites, each having a unique digital address and Uniform Resource Locator (URL). This URL has a general form <http://www.ou.ac.in/>, where 'http' refers to the protocol used, and 'ou.ac.in' refers to the server (Computer) where the information is stored. The browser allows the user to know the information on a web page. The most commonly used being the Netscape Navigator and the Microsoft explorer.

Forensic scientists and the Medico-legal experts have very little time to learn about complex computer systems or their commands. The 'Point and Click' strategy of the WWW has virtually increased the computer usage for the sake of Internet. People of various forensic departments of this modern age will be benefited if they can also learn and use the Internet resources, its language and tools.

Different search tools over internet

WWW has an enormous content of information and a systematic way of search is needed for proper accessing of information, which prevents the wastage of time. In order to effectively browse information, it is important to have an idea of what we are searching for and also a search tool best suits for your job to be done. There are various searching tools on the Internet. Some of them are listed below:

Search Engines

The usage of Search engines is very minimal, when not used correctly as they may return lot of useless information. Search Engines available on the Internet are given on Table1.

Table 1 - List of Search Engines

Google	http://www.google.com or www.google.co.in
Lycos	http://www.lycos.com
Exite	http://www.exite.com
Yahoo	http://www.yahoo.com
Galaxy search	http://www.galaxy.com
Alta Vista	http://www.altavista.digital.com
Webcrawler	http://www.webcrawler.com
Northern Light	http://www.nlsearch.com
In-foseek	http://www.infoseek.com
Hot Bot	http://www.hotbot.com
Looksmart	http://www.looksmart.com

Meta Search Engines

The advantage of Meta search engines are over any other search engine is that, users query si-

multaneously searched on several other search engines and directories. Some of the Meta search engines are given on Table 2.

Table 2. List of Meta Search Engines

Dog pile	http://www.dogpile.com
Eliter	http://www.eliter.com
PopularSites	http://www.popularsites.com
Jugalug Mp3	http://www.jugalug.com
The BigHub	http://www.thebighub.com
CurryGuide	http://services.currguide.com
Megasources	http://www.acr.ryerson.ca/~journal/Megasources.html

Indian Search Engines

Some of the Indian search engines are given on Table 3.

Table 3. List of Indian Search Engines

123 India	http://www.123india.com
Khoj	http://www.khoj.com
Agni	http://www.indiawatch.org.in/agni
Indian Homepage	http://indiatime.com/urls/Search_indiaurls.htm.com
Search Engine	http://searcg.keralanuada.com/forIndiainternetservices

Open directory project

The Open directory project operates the goal of creating useful information resources and also is one of the most comprehensive human - edited directories of the Web. It is the only major directory that is totally free. It is made available free to the user who agrees with the free use license. The open directory powers the core directory services for some of the most popular engines like Google, Netscape search, Lycos etc.

Forensic Science on the internet

The Forensic science refers to a group of specialties in science and medicine that apply their principles and methods to legal questions of a Criminal or Civil nature⁷ for the administration of justice. The boundaries of Forensic science are not only limited to the research labs of Pathologists, Serologists, Psychiatrists, Odontologists, Toxicologists, Chemists, Molecular biologists, Entomologists, and Criminologists but also extends to Court room for their expert witness in times of need.

The internet can be used by the forensic people not only to read and send e-mail, access to

photographs, video samples, text books, graphs, journals, abstracts, etc., but also to join in a discussion forum group, who are actively involved in the research and development of the subject, which will give the individual the scope for him to enhance his knowledge in his field by knowing the latest advancements in the science and technology for his forensic investigation. Along with the above, information about education, research and job opportunities can also be accessed. Expert consultation can be given/ provided online to the government and Non-Government Organizations in times of necessity voluntarily / non - voluntarily.

There are many databases available on the Net which are very useful to Forensic science experts and also to people from other subjects. One such database is MEDLINE. It is a premier bibliographic database of National Library of Medicine (NLM) covering various fields like medicine, Nursing, Dentistry, etc. Citations for MEDLINE are created by the NLM, International MEDLARS partners, and Co-operating professional organizations. Every week MEDLINE records are incorporated into Pub Med

(<http://www.ncbi.nlm.gov/pubmed/>), which will be assigned a Pub Med unique identifier.

The use of Weblibliography for the forensic Science is to direct people to some of the best resources on the Web for research and information⁸. According to the spring 2003 issue of issues in science and technology librarianship, there are a total of 101 - sites in all - referring to Forensic science resources⁹. In October 2003, the C & RL News published an article, which focuses on free web sites, which also includes a section

on Medical death investigation¹⁰.

The present article has gathered the resources on the web for Forensic sciences related web sites in India. Here we also included some of the additional web resources on non-Indian origin for the associated subjects in forensic science like Forensic pathology, Forensic serology, Forensic entomology etc. List of some of the links and resources other than India are furnished in the Table 4.

Table.4 List of directory resources

Zeno's Forensic Site	http://forensic.to/forensic.html
Reddy's Forensic Page	http://www.forensicpage.com/
Forensic-Evidence.com	http://www.forensic-evidence.com/
Kulesh's Forensic Page	http://vip.poly.edu/kulesh/forensics/list.htm
Kruglick's Forensic Resource and Criminal Law Search Site	http://www.kruglaw.com/
Yahoo Directory of Forensic Science Resources	http://dir.yahoo.com/Science/Forensics/
Google Web Directory in Forensic Sciences	http://directory.google.com/Top/Science/Science_in_Society/Forensic_Science/

Journals, magazines and news letters Indexed

Finding Forensic science literature is always a chal-

lenge, because every time it is indexed only in one index or on the Website of publisher or by multiple indexes. A list of indexed journals (with abstract and full text) is given on the Table 5.

Table. 5: List of indexed journals (Abstracts and full text)

American Journal of Forensic Medicine and Pathology	http://www.amjforensicmedicine.com/
Forensic Science International	http://www.sciencedirect.com/science/journal/03790738
Canadian Society of Forensic Science Journal	http://www2.csfs.ca/csfs_journal.aspx
Journal of Forensic Identification	http://www.theiai.org/publications/jfi.html
Forensic Science Review Indexes	http://www.geocities.com/CapeCanaveral/Galaxy/2044/index.html
Information Bulletin for Shoeprint/Toolmark Examiners	http://www.intermin.fi/intermin/hankkeet/wgm/home.nsf/pages/47A43E6C3D552B2CC2256C8E003C04D0
International Journal of Legal Medicine	http://link.springer-ny.com/link/service/journals/00414/index.htm
Journal of Forensic Sciences	http://www.aafs.org/?section_id=journal_of_fs&page_id=searchable_index
Science & Justice (formerly Journal of the Forensic Science Society)	http://www.forensic-science-society.org.uk/publications/saj.html
Identification Canada	http://www.cis-sci.ca/Content/index.htm
American Journal of Forensic Psychiatry	http://www.forensicpsychonline.com/callforpapers.htm
American Journal of Forensic Psychology	http://www.forensicpsychology.org/journalpg.html
Australian Journal of Forensic Sciences	http://search.informit.com.au/browseJournalTitle;res=E-LIBRARY;issn=0045-0618
British Journal of Forensic Practice	http://www.pavpub.com/pavpub/journals/BJFP/index.asp
Journal of Forensic Document Examination	http://www.afde.org/journal.html
Journal of Forensic Identification	http://www.theiai.org/publications

Full text

Forensic sciences journals are available on the

Internet, which are listed below, are accessible to the members of the association/s published. List of Full text journals are given on Table 6.

Table 6: List of full text journals web sites

FBI Law Enforcement Bulletin	http://www.fbi.gov/publications/leb/leb.htm
Forensic Science Communications	http://www.fbi.gov/hq/lab/fsc/current/index.htm
In the Spotlight: Forensic Science	http://www.ncjrs.org/forensic/summary.html
Crime and Clues: The Art and Science of Criminal Investigation	http://www.crimeandclues.com/index.htm
FACES forward	http://www.ga.lsu.edu/faces/forward.html
Scientific Testimony: An Online Journal	http://www.scientific.org
International Journal of Drug Testing	http://www.criminology.fsu.edu/journal
Forensic Echo: Behavioral & Forensic Sciences in the Courts	http://echo.forensicpanel.com
IABPA Newsletter	http://www.iabpa.org/newslett.htm
I.J.D.E.: International Journal of Digital Evidence	http://www.utica.edu/academic/institutes/ecii/ijde

Forensic Science E - Books

books are furnished on Table 7

List of web sites related to Forensic science

Table 7: List of e-Books

Forensic Net Base	http://www.forensicnetbase.com/
Handbook of Forensic Services	http://www.fbi.gov/hq/lab/handbook/forensics.pdf
Freedom of Information Act Electronic Reading Room	http://foia.fbi.gov/room.htm
Death Investigations: A Guide for the Scene Investigator	http://www.ncjrs.org/pdffiles/167568.pdf
FBI's Freedom of Information Act Electronic Reading Room	http://foia.fbi.gov/room.htm
FBI Famous Cases	http://www.fbi.gov/libref/historic/famcases/famcases.htm
Forensic Science Society's Book Reviews	http://www.forensic-science-society.org.uk/publications/br.html
National Criminal Justice Reference Service	http://www.ncjrs.gov/viewall.html

Organizations

Government and Commercial Laboratories

Here in this section, details of government and commercial Laboratories are furnished on the Table 8 and Table 9 respectively.

Table 8. List of Foreign Government Laboratory web sites

Arkansas State Crime Laboratory	http://www.state.ar.us/crimelab
Virginia Division of Forensic Science	http://www.dcjs.state.va.us/forensic
FBI Laboratory	http://www.fbi.gov/hq/lab/labhome.htm
U.S. Fish and Wildlife Service Law Enforcement Forensics Laboratory	http://www.lab.fws.gov/
Utah Department of Public Safety Bureau of Forensic Services	http://forensicservices.utah.gov/

Table 9. List of foreign commercial Laboratories web sites

Armstrong Forensic Laboratory	http://www.aflab.com
Aegis Sciences Corporation	http://www.aegislabs.com
PHOTEK	http://www.photekimaging.com
Speckin Forensic Laboratories	http://www.4n6.com
Forensic Analytical	http://www.forensica.com
CG Labs, Inc	http://cglabs.com
Bode Technology Group	http://www.bodetech.com
R. E. Davis Chemical Corp.	http://www.redavis.com/websites/davischemical
Norwich Document Laboratory	http://www.questioneddocuments.com

Table 10. List of foreign organizations web sites

American Academy of Forensic Sciences	http://www.aafs.org/
Armed Forces Institute of Pathology	http://www.afip.org/
The Forensic Science Society	http://www.forensic-science-society.org.uk/
National Institute of Justice (NIJ)	http://www.ojp.usdoj.gov/nij/
Canadian Society of Forensic Science	http://www.csfs.ca/
International Association for Identification	http://www.theiai.org/
American Society of Crime Laboratory Directors	http://www.ascl.org/
American Board of Criminalistics (ABC)	http://www.criminalistics.com/
Federal Bureau of Investigation (FBI)	http://www.fbi.gov/
American Board of Forensic Anthropology (ABFA)	http://www.csuchico.edu/anth/ABFA/
American Board of Forensic Document Examiners (ABFDE)	http://www.abfde.org/
Association for Crime Scene Reconstruction (ACSR)	http://www.acsr.org/
Australian and New Zealand Forensic Science Society	http://www.anzfss.org.au/

Forensic anthropology

Forensic Anthropology is the application of the science of physical anthropology in the legal procedures. A forensic anthropologist can assist

in the identification of deceased individuals whose remains are decomposed, burned, mutilated or otherwise unrecognizable. Here in this section, details of websites related to Forensic anthropology are furnished on the Table 11.

Table 11. List of forensic anthropology related web sites

American Board of Forensic Anthropology	http://www.csuchico.edu/anth/ABFA/
International Association for Craniofacial Identification	http://www.forensicartist.com/IACI/index.html
Albert, A. Midori - Ph.D, Forensic Anthropology	http://www.uncwil.edu/people/albertm
Forensic Anthropology	http://medstat.med.utah.edu/kw/osteo/forensics/index.html
Forensic Anthropology Center University of Tennessee	http://web.utk.edu/~anthrop/index.htm
Bodies of Evidence	http://www.channel4.com/history/microsites/B/bodies/index1.html
Forensic Anthropology FAQ	http://people.uncw.edu/albertm/forensic.htm
ForensicAnthro.com	http://www.forensicanthro.com/
Online Skeleton	http://www-personal.une.edu.au/~pbrown3/oskel.html
Osteointeractive	http://medstat.med.utah.edu/kw/osteo/
Death's Acre	http://www.deathsacre.com/
Midwest Bioarchaeology and Forensic Anthropology Association	http://www.luc.edu/depts/anthropology/BARFAA/
LSU Faces Lab	http://www.lsu.edu/faceslab/

Forensic botany

Forensic botany is the application of plant science in the resolution of legal questions in order

to assist Judiciary. Here in this section, details of Web sites related to forensic botany are furnished on Table 12.

Table 12: List of forensic botany related web sites

Forensic Botany	http://myweb.dal.ca/jvandomm/forensicbotany
Crime Scene Botanicals - Forensic Botany (Botanical society of America)	http://www.botany.org/PlantTalkingPoints/crime.php
Forensic Paleontology A New Way to Catch Crooks	http://www.crimeandclues.com/pollen.htm

Forensic chemistry & forensic toxicology

Forensic chemistry is the application of principles of chemistry in the enforcement of Law. Forensic toxicology is the application of

toxicology in legal procedures. Previously there are only a few 'pure' toxicology sites in the Web but now we have a very good number of websites related to toxicology and some of them are furnished here in Table 13.

Table 13: List of Forensic Chemistry and Toxicology related web sites

The International Association of Forensic Toxicologists	http://www.tiaft.org
The W.W.W.Virtual Library: Forensic Toxicology	http://home.lightspeed.net/~abarbour/vlibft.html
The Society of Forensic Toxicologists	http://www.soft-tox.org
Alan Barbour's Forensic Toxicology Page	http://www.abarbour.net
Mass Spectrometry Databases	http://www.ualberta.ca/~gjones/mslib.htm
Scientific Working Group for the Analysis of Seized Drugs	http://www.swgdrug.org
Forensic Toxicologist Certification Board, Inc	http://home.usit.net/~robsears/ftcb/index.htm
Southwestern Association of Toxicologists	http://www.sat-tox.org
Guidelines for the Interpretation of Analytical Toxicology Results & Unit of Measurement Conversion Factors	http://www.leeds.ac.uk/acb/annals/Webwise/Webwise97-1.html
Centre of Behavioural and Forensic Toxicology	http://www.cbft.unipd.it
Forensic Chemistry Network	http://www.geocities.com/CapeCanaveral/4329/
Chemical & Engg. News: Detecting Illegal Substances	http://pubs.acs.org/hotartcl/cenear/970929/detect.html
ChemFinder.com	http://chemfinder.cambridgesoft.com
Molecular Expressions: Optical Microscopy Primer	http://micro.magnet.fsu.edu/primer/index.html
Mass Spectrometry Databases	http://www.ualberta.ca/~gjones/mslib.htm

Criminalistics and trace evidence

Criminalistics and Trace evidence are both catch-all terms that apply to all types of physical

evidence that may be circumstantial evidence in the trial of a case. List of criminalistics and trace evidence related websites are given on Table 14.

Table 14. List of criminalistics and trace evidence related web sites

Latent Print Examination: Fingerprints, Palm prints and Footprints	http://onin.com/fp/
Scientific Working Group on Friction Ridge Analysis, Study and Technology	http://www.swgfast.org/
Marks Working Group	http://www.intermin.fi/intermin/hankkeet/wgm/home.nsf/
Ridges and Furrows	http://www.ridgesandfurrows.homestead.com/
Optical Mineralogy Basics	http://www.eos.ubc.ca/courses/eosc221/optics/optics.html
Forensic Fiber Examination Guidelines	http://www.fbi.gov/hq/lab/fsc/backissu/april1999/houcktoc.htm
Hairs, Fibers, Crime, and Evidence	http://www.fbi.gov/hq/lab/fsc/backissu/july2000/deedrick.htm
Microscopy of Hair Part I: A Practical Guide and Manual for Human Hairs	http://www.fbi.gov/hq/lab/fsc/backissu/jan2004/research/2004_01_research01b.htm
Microscopy of Hair Part II: A Practical Guide and Manual for Animal Hairs	http://www.fbi.gov/hq/lab/fsc/backissu/july2004/research/2004_03_research02.htm
Minerals Under the Microscope	http://www.gly.bris.ac.uk/www/teach/opmin/mins.html

Ethics in forensic science

sites are furnished on Table 15.

List of ethics in Forensic science related web

Table 15. List of web sites related to ethics in forensic science

Ethics in Science	http://www.chem.vt.edu/chem-ed/ethics/
American Society of Crime Lab Directors Code of Ethics	http://www.ascl.org/ethics.html
American Academy of Psychiatry and the Law Ethical Guidelines for The Practice of Forensic Psychiatry	http://www.forensic-psych.com/articles/artEthics.html

Tool marks and ballistics

Ballistics is the 'study of Projectile in motion' while fire arms identification is primarily concerned with determining that a bullet,

cartridge case or other than ammunition, component was fired by a particular fire arm. Tool marks are the marks left on an item by a tool. Details of Web sites related to this section are furnished on Table 16.

Table 16. List of tool marks and ballistics related web sites

Firearmsid.com	http://www.firearmsid.com/new_index.htm
Firearms Tutorial	http://library.med.utah.edu/WebPath/TUTORIAL/GUNS/GUNINTRO.html
The Making of a Rifled Barrel	http://www.firearmsid.com/Feature%20Articles/RifledBarrelManuf/BarrelManufacture.htm
The Making of a Rifled Barrel	http://www.firearmsid.com/Feature%20Articles/RifledBarrelManuf/BarrelManufacture.htm
Association of Firearm and Tool Mark Examiners	http://www.afte.org/
Feasibility of a California Ballistics Identification System	http://www.gwu.edu/gelman/guides/sciences/forensics/feasibility.pdf
How Do Bullets Fly?	http://www.nennstielruprecht.de/bullfly/index.htm#Top_of_page

Crime Scene Investigation

Crime scene investigation involves the use of scientific methods, physical evidence, detective reasoning and their interrelationship to gain

explicit knowledge of the series of events that surrounds the commission of a crime¹³. Here in this section, details of crime scene investigation related web sites are furnished on Table 17.

Table17. List of crime scene investigation related web sites

Crime SceneInvestigation.net	http://www.crime-scene-investigator.net/index.html
Bloodstain Pattern Analysis Tutorial	http://www.bloodspatter.com/BPATutorial.htm
Footwear & Tire Track Impression Evidence	http://members.aol.com/varfee/mastssite/index.html

Forensic entomology

Forensic entomology is the science of using insect evidence to uncover circumstances of

interest to the law, often related to a crime¹⁴. List of the Forensic entomology websites is given on Table 18.

Table18. list of forensic entomology related web sites

Forensic-Entomology.com	http://www.forensic-entomology.com/
Forensic Entomology: Insects in Legal Investigations	http://www.forensicentomology.com/index.html
American Board of Forensic Entomology	http://research.missouri.edu/entomology/
Decomposition: What Happens to the Body After Death?	http://www.deathonline.net/decomposition/index.htm
European Association for Forensic Entomology	http://www.eafe.org/
Forensic Entomology	http://www.benecke.com/maden.html
Insect Investigations: About Forensic Entomology	http://www.insectinvestigations.com/aboutfe.htm
A Brief History of Forensic Entomology Mark Benecke, Certified Forensic Biologist	http://www.benecke.com/briefhist.pdf
The Testimony of Bugs	http://www.main.com/~brad/techrep/techrep.htm
Forensic Biology Laboratory - University of Alabama at Birmingham	http://www.dpo.uab.edu/~jwells/FBL.html
Forensic Entomology: What the Blowfly Saw	http://tlc.ousd.k12.ca.us/~acody/forensic.html

Forensic serology

Forensic serology is the application of study of

blood, semen, saliva and other body fluids to legal matters. List of web sites related to this section are furnished on Table 19.

Table19. List of forensic serology related web sites

Forensic Serology	http://faculty.ncwc.edu/toconnor/425/425lect13.htm
Serology: It's in the Blood	http://www.trutv.com/library/crime/criminal_mind/forensics/serology/1.html
Collection and Preservation of Blood Evidence from Crime Scenes	http://www.crime-scene-investigator.net/blood.html
Forensic Fact File: Forensic?Serology	http://www.nifs.com.au/FactFiles/serology/what.asp?page=what&title=Forensic?Serology

Forensic DNA profiling

Forensic DNA Analysis is based on the identification of certain genetic sequences called

“Markers” which are highly variable and particular to each person. The related websites are furnished on Table 20.

Table 20. List of forensic DNA analysis related web sites

DNA Technology in Forensic Science	http://books.nap.edu/books/0309045878/html/index.html
The Evaluation of Forensic DNA Evidence	http://search.nap.edu/readingroom/books/DNA/
Basics of DNA Fingerprinting	http://www.biology.washington.edu/fingerprint/dnaintro.html
DNA Forensics	http://www.ornl.gov/sci/techresources/Human_Genome/elsi/forensics.shtml
DNA Testing: Introduction and Index	http://www.vivo.colostate.edu/hbooks/genetics/medgen/dnatesting/
Chemical Detective: DNA Typing	http://caligula.bcs.deakin.edu.au/bcs_courses/forensic/Chemical%20Detective/DNA_Type.htm
DNA Testing	http://arbl.cvmb.colostate.edu/hbooks/genetics/medgen/dnatesting/index.html
DNA Typing in Forensic Medicine & Criminal Investigations	http://www.benecke.com/pdf-files/natwiss.pdf
Forensic Use of DNA Profiling	http://www.aic.gov.au/publications/tandi/ti26.pdf
Interpol DNA Profiling	http://www.interpol.int/Public/Forensic/dna/default.asp
LiveScience.com: DNA and DNA Testing	http://www.livescience.com/dna/
Examiner Bias in Forensic RFLP Analysis	http://www.scientific.org/case-in-point/articles/thompson/thompson.html
Wikipedia: Genetic Fingerprinting	http://en.wikipedia.org/wiki/DNA_fingerprinting
Year 10 Science DNA Profiling Webquest	http://www.geocities.com/dnawebquest/
Biotechnology Australia: DNA Profiling	http://www.industry.gov.au/biotechnologyonline/human/dnaprofile.cfm
Human Genome Project: DNA Forensics	http://www.ornl.gov/sci/techresources/Human_Genome/elsi/forensics.shtml
HowStuffWorks: How DNA Evidence Works	http://www.howstuffworks.com/dna-evidence.htm
Forensic Biology Laboratory University of Alabama	http://www.dpo.uab.edu/~jwells/FBL.html
Hope Denise Hall DNA Action Memorial	http://hope-dna.com/
Arresting Development in DNA Typing	http://www.forensic-evidence.com/site/Biol_Evid/BioEvid_dna_jones.html
Blackett Family DNA Activity	http://www.biology.arizona.edu/human_bio/activities/blackett2/overview.html
STRBase	http://www.cstl.nist.gov/biotech/strbase/
Mitochondrial DNA Analysis in the FBI LAB.	http://www.fbi.gov/hq/lab/fsc/backissu/july1999/dnalist.htm
MITOMAP: A Human Mito-chondrial Genome Database	http://www.mitomap.org/
Mitochondrial DNA Concordance	http://shelob.bioanth.cam.ac.uk/mtDNA/toc.html
National Center for Biotechnology Information	http://www.ncbi.nlm.nih.gov/
DNA Testing: An Introduction for Non-Scientists	http://www.scientific.org/tutorials/articles/riley/riley.html

Forensic Science - Terminology

terminology is given on Table 21.

List of web sites related to Forensic science

Table 21. List of forensic science terminology related web sites

Forensic DNA Glossary	http://www.forensicdna.com/DNAGlossary.htm
Glossary of Terms of the Death Investigation	http://www.vifsm.org/assets/glossary.html
Blood Stains Pattern Analysis Terminology	http://www.iabpa.org/Terminology.pdf
SWGFAST Glossary	http://www.swgfast.org/Glossary_Consolidated_ver_1.pdf
Glossary of Typography	http://www.counterspace.us/typography/
On-Line Medical Dictionary	http://cancerweb.ncl.ac.uk/omd/
Forensic Botany Glossary	http://myweb.dal.ca/jvandomm/forensicbotany/glossary.html

Forensic Odontology

Odontology is the study of teeth. Forensic odontology is a specialized field of dentistry where in a death investigation; identity has sometimes been established through analysis of

the teeth and accompanying dental prosthetics, fillings and compounds.¹⁵

List of the websites related to Forensic Odontology or Forensic Dentistry has been given on Table 22.

Table 22. List of forensic odontology / dentistry related web sites

Forensic Dentistry Online	http://www.forensicdentistryonline.org/
Australian Society of Forensic Dentistry	http://www.uq.edu.au/asfd/
Bureau of Legal Dentistry	http://www.boldlab.org/
Forensic Odontology: University of Queensland	http://www.uq.edu.au/
Odontology: Detection of Child Abuse	http://www.ada.org/topics/abuse.html
American Board of Forensic Odontology	http://www.abfo.org/
Forensic Odontology Gopher	gopher://ucivnokia.tvn.lu.se/
Issues in Human and Animal Bite Mark Management	http://www.forensic.to/webhome/bitemarks/
The British Association of Forensic Odontology	http://www.bafo.org.uk

Questioned document examination

A document is any material that conveys a message whether visible, invisible or partially visible. Where a question, such as authorship or authenticity, arises in reference to a document, the document should be submitted to a question

document examination¹⁶. The application of allied sciences and analytical techniques to questions concerning document is termed Forensic document examination¹⁷. List of Web sites related to this section is given on Table 23.

Table 23. List of questioned document examination related web sites

Forensic Document Examination Overview	http://www.forensic.to/webhome/qdewill/
Forensic Document Examination: An Overview	http://www.hk-lawyer.com/2000-6/June00-92.htm
Guidelines for Forensic Document Examination	http://www.fbi.gov/hq/lab/fsc/backissu/april2000/swgdoc1.htm
Questioned Document Examination Page	http://qdewill.com/index.htm?submit=Home
Questioned Documents Site of Emily J. Will	http://www.qdewill.com/
American Board of Forensic Document Examiners	http://www.abfde.org/
American Society of Questioned Document Examiners	http://www.asqde.org/
Forensic Document Examination and the PenOp Dynamic Digitized Signature Technology (PDF)	http://www.ecomaus.com/legal%20documents/Forensic.pdf
Identifont	http://www.identifont.com/index.html
Fonts.Com	http://www.fonts.com/FindFonts/search.htm
Omniglot	http://www.omniglot.com/
The Classic Typewriter Page	http://staff.xu.edu/~polt/typewriters/index.html
Virtual Typewriter Museum	http://www.typewritermuseum.org/
CounterSpace	http://www.counterspace.us/typography/
Bookbinding: A Tutorial	http://www.cs.uiowa.edu/~jones/book/

Medico legal death investigation

Medico legal death investigation is the application of medical knowledge in the

investigation of a death in a suspected crime scene. List of web sites related to medico legal death investigation are furnished on Table 24.

Table 24. List of medico legal death investigation related web sites

American Board of Medico-legal Death Investigators, Inc	http://www.slu.edu/organizations/abmdi/
CDC Guidelines for Death Scene Investigation of Sudden, Unexplained Infant Deaths	http://www.cdc.gov/mmwr/preview/mmwrhtml/00042657.htm
"Death Investigation: A Guide for the Scene Investigator" A publication of the National Institute of Justice	http://www.ncjrs.gov/pdffiles/167568.pdf
Medico legal Death Investigation System: Workshop Summary	http://books.nap.edu/openbook.php?record_id=10792&page=38

Forensic pathology

Forensic pathology is a branch of medicine concerned with determining the cause of death

at cellular level, usually for criminal and civil law cases in some jurisdictions¹⁸. List of web sites related Forensic pathology is given on Table 25.

Table 25. List of forensic pathology related web sites

American Society of Clinical Pathologists	http://www.ascp.org/
Armed Forces Institute of Pathology	http://www.afip.org/
Autopsy	http://www.hbo.com/autopsy/
University of Sheffield - Department of Forensic Pathology	http://forensic.shef.ac.uk/
College of American Pathologist	http://www.cap.org/apps/cap.portal
Forensic Pathology Index	http://library.med.utah.edu/WebPath/FORHTML/FORIDX.html

Forensic photography

Forensic photography (sometimes referred to as forensic imaging or crime scene photography) is the art of producing an accurate reproduction of a crime scene or an accident scene for

the benefit of court or to aid in the investigation. It is a part of the process of evidence collecting. It provides investigators with photos of bodies, places and items involved in the crime. List of web sites related to forensic photography is given on Table 26.

Table 26. List of forensic photography related web sites

Crime Scene and Evidence Photography	http://www.crime-scene-investigator.net/csi-photo.html
Crime Scene Photography Requirements of Criminal Investigative	http://www.geocities.com/cfpdlab/csphoto.html
Basic Crime Scene Photography	http://www.sctv.org/crimetocourt/Special%20Pages/photography.htm
Crime Scene Photography 1.01	http://www.brazoria-county.com/sheriff/id/photography/
Forensic Photography Certification	http://www.theiai.org/certifications/imaging/
Latent Print Photography	http://www.redwop.com/minutiae.asp?action=showArticle&ID=204

Forensic psychology

Forensic Psychology is the application of principles of psychology and knowledge in various medico legal situations to resolve the issues. Typical issues include child disputes, child abuse & neglect, assessing personal capacity to

manage one's affairs, matters of competency to stand trial, criminal responsibility, and personal injury and advising judges in matter relating to sentencing regarding various mitigants and actuarial assessment of future work. List of web sites related to this section is given on Table 27.

Table 27. List of forensic psychology related web sites

American Academy of Forensic Psychology / American Board of Forensic Psychology	http://www.abfp.com/
David Willshire's Forensic Psychology and Psychiatry Links	http://members.optusnet.com.au/dwillsh/forensic.htm
Psychology Assessment Connection	http://www.forensic-psych.com/
How to Cross-Examine a Psychological Witness	http://members.aol.com/Psychquery/index.html
Trowbridge Foundation	http://www.trowbridgefoundation.org

Forensic psychiatry

Forensic psychiatry is the application of knowledge of psychiatric medicine in medico

legal cases. It encompasses the interface between law and psychiatry. List of web sites related to Forensic psychiatry are furnished on Table 28.

Table 28. List of forensic psychiatry related web sites

Forensic Psychiatry & Medicine: Harold J. Bursztajn, MD	http://www.forensic-psych.com/
Forensic Psychiatry On-Line	http://www.priory.com/forpsy.htm
American Academy of Psychiatry and the Law	http://www.emory.edu/AAPL/
American Academy of Psychiatry and The Law: Professional Ethics	http://www.forensic-psych.com/articles/artEthics.html
Brunner-Routledge: The Journal of Forensic Psychiatry and Psychology	http://www.tandf.co.uk/journals/titles/14789949.html
David Willshire's Forensic Psychology and Psychiatry Links	http://members.optusnet.com.au/dwillsh/forensic.htm
Institute of Law, Psychiatry, and Public Policy	http://www.ilppp.virginia.edu/
Chacko, Chowallur Dev M.D.,F.A.P.A.	www.chackoforensicpsychiatry.com/
Impressions of a Man: An Objective Forensic Guideline to Profile Violent Serial Sex Offenders	www.corpus-delicti.com/impress.html

Entertainment

From the entertainment point of view, many serials like CSI, CSI Miami and Forensic files have

basic concepts of Forensic science knowledge. List of web sites related to this entertainment section related web sites are furnished on Table 29.

Table 29. List of forensic science entertainment related web sites

Autopsy (HBO)	http://www.hbo.com/autopsy/
CSI: Crime Scene Investigation (CBS)	http://www.cbs.com/primetime/csi/main.shtml
CSI: Miami (CBS)	http://www.cbs.com/primetime/csi_miami/home.shtml
Forensic Files (Court TV)	http://www.courttv.com/onair/shows/forensicfiles/
The New Detectives and FBI Files (Discovery Channel)	http://dsc.discovery.com/fansites/onthecase/onthecase.html

Forensic art

Forensic art is a law enforcement artistic technique used in the identification, apprehension, or conviction of wanted persons.

Forensic art encompasses several disciplines including composite art, image modification, age progression, post-mortem reconstruction and demonstrative evidence. List of web sites related to Forensic Art is given on Table 30.

Table 30. List of forensic art related web sites

For Artist: Forensic Art	http://www.forartist.com/forensicpage.htm
Forensic Art Workshops	http://tel.occe.ou.edu/forensic/
Neville's Forensic Art Service	http://www.forensicartist.com/
Sculptural Forensics	http://www.sculpturalforensics.com/
Forensic Artist and The Statute of Limitations	http://www.crime-scene-investigator.net/forensicartist.html
Investigation into the Use of 3D Computer Graphics for Forensic Facial Reconstruction	http://www.dcs.gla.ac.uk/~mc/2ndYearReport/Contents.html

Forensic science resources in India

Although our ancestors did not know forensic science in its present form, scientific methods in one way or the other have been followed in the investigation of crimes. Its detailed reference is found in Kautilya's 'Arthashastra,' which was written about 2300 year's ago¹⁹. Till now, in India Forensic science has not been given enough importance. With the advancement of science and technology the present form of Forensic science has become a multidisciplinary subject in India. The application of science and technology in the detection and investigation of crime for the administration of justice is now becoming important for the Police & Judiciary departments in resolving the disputes. Before independence we had a few Laboratories to deal with the scientific analysis of physical evidences, viz. Chemical examiner's Laboratory, Fingerprint

Bureau, Serologist to the Government of India, Government Examiner of Questioned documents and few scientific divisions attached to the CID in few states. Now we have full fledged four central Forensic Science Laboratories, Nineteen State Forensic Science Laboratories²⁰ and One Private Forensic Science Laboratory (Truth Lab)^{21, 22, 23}. Recently Sri Narendra Modi, The Chief Minister of Gujarat has announced that his government is planning to establish a Forensic Science University in Gujarat State²⁴. Some FSLs have their own Websites, where as the other FSLs, which do not have; their own websites are attached to the concerned State Police Academies. This article focuses on a few Indian Forensic Science Organizations / Laboratories web sites and includes few websites related to educational links, Indian journals and miscellaneous. List of few Forensic science laboratories and Organizations is given in Table 31.

Table 31. List of forensic science laboratories and organizations in India

Directorate Of Forensic Science (DFS), Ministry of Home Affairs	http://dfs.gov.in/
Bureau of Police Research and Development	http://bprd.nic.in/
Finger Print Bureau - CID, West Bengal, India	http://cidwestbengal.gov.in/special-units-finger-print-bureau.php
Department of Explosives	www.explosives.nic.in/
The Central Forensic Science Laboratory, CBI	www.cbi.gov.in/cfsl/about.htm
National crime records bureau	http://ncrb.nic.in/cfpb.htm
The AP State Forensic Science Laboratory	www.apfsl.org/
Haryana forensic science Laboratory	http://fslharyana.nic.in/
Uttar Pradesh forensic science laboratory	uppolice.up.nic.in/forensic.html
Madhya Pradesh Forensic Science Laboratory	http://www.mppolice.gov.in/dynamic/branches/fslcid.htm
Himachal Pradesh Forensic Science Laboratory	http://himachal.nic.in/home/Forensics/Organisation.htm
Directorate of Forensic science, Assam	http://www.dfsassam.org/
Tamil Nadu State Forensic Science Department	http://www.tn.gov.in/tamilforensic
Chemical examiner's laboratory, kerala	http://kerala.gov.in/dept_chemicalexam/chemicalexam.htm
National Bureau of Investigations (NBI)	www.nbiindia.com/index.htm
India's first private forensic science lab (Truth labs)	http://truthlabs.org/default.aspx

Courses offered by various universities and colleges in India

At present very few universities/colleges in India offer Forensic science courses at

undergraduate and postgraduate level, whereas in the developed world this number is very large 25. List of Universities and colleges are furnished on Table 32.

Table 32. List of universities and colleges

Department of Chemistry, Osmania University	www.osmania.ac.in
Department of Forensic Science, Punjabi University	www.punjabiversity.ac.in
University of Delhi, Department of Anthropology	www.du.ac.in
Department of Chemistry, Gujarat University	www.gujaratuniversity.org.in
Dr. Harisingh Gour University, Sagar	www.sagaruniversity.nic.in/dept/crim_home.htm
Madras University, Chennai	
Lok Nayak Jayaprakash Narayan National Institute of Criminology and Forensic science (NICFS)	www.nicfs.nic.in/
Guru Gobind Singh Indraprastha University	www.ipu.ac.in/
St.Xavier's Collge, Mumbai	www.xaviers.edu/frame12.htm
The University of Lucknow	www.lkouniv.ac.in/
Karnataka University	www.kud.ernet.in
Allahabad Agriculture Institute (Deemed University)	www.aaidu.org/default.asp
Amity Institute of Behavioural Health and Applied Sciences	www.amity.edu/aibhas/prog.asp
Institute of Forensic science & Criminology, Bundelkhand University.	www.bujhansi.org/

Table 34. Forensic science journals in India

Indian Congress of Forensic Medicine And Toxicology	http://www.icfmt.org/
Medico- legal update	www.medicolegalupdate.org/
Anil Aggarwal's Internet journal of Forensic Medicine & Toxicology	www.geradts.com/anil/ij/indexpapers.html
Journal of Postgraduate Medicine	www.jpgmonline.com/
The Indian Journal of Criminology & Criminalistics	www.nicfs.nic.in/publications.htm
Journal of Punjab Academy of Forensic Medicine & Toxicology	www.indianjournals.com
Indian internet journal of Forensic medicine & Toxicology	
Journal of the Indian society of Toxicology	
Journal of Indian Society of Forensic Medicine	
Indian Journal of Forensic Science	www.indianajournals.com/journals%20category%20detail.asp?cat=25
Indian Journal of Criminology	
Indian police Journal (The)	

Miscellaneous Websites

furnished on Table 35.

List of Miscellaneous web sites in India are

Table 35

Forensic accounting in India	www.indiaforensic.com
Forensic Entomology India	www.forensicentomologyindia.com
Forensics Guru: Computer Forensic Solutions for India	www.forensicsguru.com
All about forensic science.com: Forensic Science in India	www.all-about-forensic-science.com/forensic-science-in-india.html
Forensic India.com: Indian gate way of Forensic Medicine	www.forensicindia.com
Dental India	www.dentalindia.com/forensic.html

Impact of the web and its limitations in forensic science

One of the impacts of the Internet is it may spur an increase in knowledge of science and technology in developing countries. Use of the Internet is more in developing countries rather than developed ones. Enormous range of tools and literature can be accessed by the use of Internet because of its widespread nature. Many

journals are published online, which have lower costs than the printed ones. An Organization named High Wire Press, a not-for-profit body set by Stanford University (hwmg.stanford.edu/developing.html) 26. This kind of free flow of information has enabled any one with good computer skills to setup a site on specific topics. Inaccurate information may be found in certain Web pages but a major portion of information is always true.

Limitations of the Internet come into picture only when there is a necessity to transmit information that is confidential. Hacker who tries to hack the system can easily get into such information's, which may lead to misuse. Another limitation of the Web is the security issue. Computer virus is basically a computer program that it returns to attach itself to other programs and replicate whenever those programs are executed. Most common viruses that affect computers today-viruses such as concept, Trozan, Nuclear, Showoff, Adom, Wazzu and Laroux – are Micro Viruses. The most important weapon to combat a computer virus is developing a competent Anti-virus strategy. Booting from a clean write-protected diskette is the only way to start up the system without any viruses in memory. Another way of combating a virus problem is having an up-to-date authenticated antivirus software, which are updated to deal with emerging problems and to rectify them.

Conclusion

The recent developments in Forensic science can be easily accessed by using Internet in a proper object orientated search. Various useful databases already exist and many are added to it every day. This makes the usage of web even more important from the point of gaining valuable information. Researcher around the world can come into contact with each other and can share, compare, update and collate their research easily. From one point of view, the web is highly useful in getting valuable information from images and videos that are shared over the Internet. This has an added advantage over any other communication media because 'real time' information can be gathered which consumes less time in accessing to the new events that are happening around the world. Access to the web is simple, but handling enormous quantity of information is the really a tough job. Confidentiality and security are major concerns, hence safe guards have been built into many of the web applications with 128 bit encryption used by Netscape and Microsoft, and credit card transactions are becoming safer day by day. It is high time that Forensic Scientists should learn using of the web to the greatest extent in order to integrate information for assisting the Criminal Justice System for the welfare of the society.

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