

Missing Found Web Application

An App for the management of unidentified dead bodies and missing persons

Abstract:

One of the oldest problems of the policing system in India is the matching of unidentified dead bodies with missing person reports. This paper attempts to solve that problem with the use of information technology. The main obstacles in the process of identification are identified and addressed. The application developed as a result of this analysis is tested against live data of missing person reports and unidentified dead bodies in the state of West Bengal.

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In the period 2017-19, 15390 number of Unidentified Dead Bodies (hereafter referred as UIDB) were reported in West Bengal, out of which 9117 remained unidentified. These people did not come from a different planet to get killed. In most cases they belong to either a neighbouring Police Station or at most a nearby District. The problem is the failure of the matching procedure. A large number of persons are reported missing every year in the State (hereafter referred to as MP). The procedure that was being followed prior to the development of this application was that a General Diary Entry (GDE) was made with reference to the missing person in the second category. If there was a specific complaint of kidnapping/abduction, a First Information Report (FIR) was registered. Similarly, in the first category, GDE was made initially, and if there was prima facie evidence of foul play, an FIR of murder or accident caused by rash and negligent driving was registered. Messages regarding the incident were sent to all concerned by the concerned officers in charge, and the CID was also notified, which, in turn, included such information in the monthly gazette published by it. Since the officers in charge of any police station are generally overwhelmed by law and order and other duties, scant attention was paid to such messages, the photograph of the person concerned (either MP, or UIDB) was also not clear with the existing communication system and could not be used for identification. This created a scope for the arising of the following situations detrimental to police working:

- 1) a person could be kidnapped from one police station jurisdiction, murdered and then dumped in a neighbouring police station. There would be little chance of identification and resolution of either case.
- 2) A person could go missing and commit suicide in a neighbouring police station area, and there would be no matching of the two cases, leading to anguish for the family concerned.
- 3) A person could be murdered after abduction, and, the murder could be disguised as a road traffic accident in another police station jurisdiction. Again, both the cases would remain unresolved.
- 4) Apart from the above, it could also be possible that a person died of accidental causes in one police station jurisdiction, whereas the family filed a missing report in another police station jurisdiction. In case of failure on the part of the police to match the two incidents, the family would be deprived both of psychological closure and whatever compensations (insurance etc.) were due to them.

It is clear that the main hurdle is the inability of police officers to communicate a picture of the MP/UIDB in real time and also the lack of time on the part of officers to do manual

matching. Automatic facial recognition is an evolved technology, and software exists for the conversion of a photograph containing a face into a 300-dimensional vector. At the heart of this application is the aforesaid automatic facial recognition.

The WB Missing Found web application was built using the Django framework by the author (*It was earlier called Khoya Paya App but was changed as it was felt that rural people in WB won't connect.*). It allows police station officers to upload a photograph and details of a MP (both GDE and specific FIR) or an UIDB (both categories) as and when the information is received. The application processes the photograph and matches its facial features against the eligible entries in the database. For example, if the photograph is of a missing female, it would match it against reported unidentified dead bodies of females. The officer making the report would get an immediate feedback if any such match exists as soon as the page loads after the submission of the report form. Both the concerned officers (missing person and dead body) would also get immediate SMS alerts about the match. Since the officers may be engaged in other duties at the time, and unable to pay attention to SMSs, SMS alerts would also be sent to the respective district nodal officers. This would enable the officers to follow up on both cases. In case the photographs are indisputably identifiable as being of the same person, the officers themselves could confirm the match. Otherwise, the families would be informed for further action and identification. This would lead to a resolution of both the cases. The threshold of matching has been kept intentionally low, as it is felt that any number of false positives are preferable to a single false negative in such sensitive matters. At the present moment, this first level of matching is being based entirely on the photographs. Subsequently, it is planned to include the height of the person in the algorithm. Height is something which cannot be concealed, even if the face is unrecognisable due to bloating (water death, ageing), deformation (trauma injury, as in a train accident) or intentional defacement (by acid or burning). For this to be effective, a protocol has to be devised for measurement of the heights of dead bodies accurately, preferably in the morgue. Also, the police officers would need to be trained to conduct enquiry to make a best guess estimate of the height of the missing person.

Since the facial matching algorithm is not guaranteed to have 100 % recall (statistically defined as the ratio of True Positives to True Positives + False Negatives), it will miss a few False Negatives. Keeping this in mind, the app allows users to manually search for either of the categories, MP or UIDB. **The app uses a geospatial database.** The search features include 1) a collection of Police Stations (say, the neighbouring Police Stations of the incident being investigated) , 2) a geographical area defined by a circle of distance D around a specified point (lat,long), and 3) keywords in the description field. In the last feature, there is also a provision for fuzzy matching to catch wrong/alternative spellings. Later on, Natural Language Processing will also be added to this feature so that it will provide semantic search rather than literal search. Lastly, once the protocol of height measurement of dead bodies is put in place, it is felt that adding height to search features will add immense accuracy.

During the development of the app, feedback from the field units was very valuable, and based on that, the following features were added. Very often UIDBs wash up on a river bank. In suicide cases and in cases where the MP is suspected to have met a train accident, the UIDBs found close to a rail-track are relevant to the search. Lastly, it is often necessary to search for UIDBs found along road-lines in suspected traffic accident deaths and also in cases where a murder is concealed by dumping a body in another jurisdiction. Catering to these requirements, the app has provision to specify a bounding-box (a rectangular area defined by picking the North-West and the South-East corners)

and searching for any UIDB along a water-body, rail track or road within that area. This was made possible by importing geospatial data of layers for roads, waterways and rail tracks in India. As a matter of fact, though the app is presently deployed only in the State of West Bengal, the river/rail/road data has been added for the entire country.

One more feature of the app is that it has provision for the public to submit a missing person report online. The telephone number of the applicant is validated by an OTP. The moment he uploads a report, the concerned police officers are intimated by mail and SMS. They can see the photograph of the missing person, act on the telephone number carried by the missing person (if provided) and also contact the applicant proactively to facilitate the formal diarising of the information. But, because the information is available immediately, it obviates the six-eight hours that a member of public would normally take to reach a Police Station and get the attention of the concerned officers. At a later stage, the applicant could physically visit the Police Station at his convenience, furnish a token number given to him by the app, verify possession of the phone number that was used to receive the OTP at the time of making the report and formalise his complaint based on these verifications. Needless to say that the app also performs the automatic facial recognition on the photo uploaded by the public, and, if god forbid, something untoward has already happened or happens in the next few hours, the app does the needful to intimate all concerned.

Conclusion:

It is hoped that the deployment of this app would dramatically help in matching of MPs and UIDBs and bring justice to the dead and closure to their families. Hopefully, a large number of murder cases presently filed as Final Report True would meet a different and more just fate. If the app is integrated pan-India, its ramifications would be momentous. One of the likely benefits is the better detection of cases of trafficking and murder of women.

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(West Bengal:1992)**

Validation:

Within a very short time of its deployment (about a month), the app has met with the following successes:

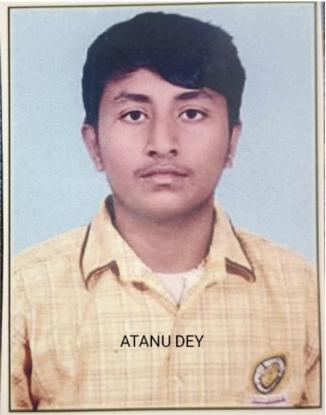
- 1) An unknown dead body of Sonarpur GRPS could be matched by the app with a missing person report of Sundarban Coastal Police Station, and the OCs concerned communicated this to the family members who identified the body.
- 2) Another citizen publicly appreciated the prompt action to recover his missing wife after he uploaded a missing person report online. His comment can be seen at <https://www.wbmissingfound.com/backend/comments/>
- 3) About 500 matches have been made, which are currently being worked out by field officers.

WB Missing Found App (<https://www.wbmissingfound.com>)

Feature 1 : Automatically matches reported cases of missing persons and unidentified bodies using facial recognition and sends real-time alerts to concerned officers. Later, Natural Language Processing will be added to match reports from description.

Matched Reports

Reported Case Match



ATANU DEY

Aug. 24, 2022

Atanu Dey

Baguiati : Bidhannagar Police Commissionerate

[Delete](#) [Edit](#)



Aug. 23, 2022

Unidentified dead body . W/a yellow, blue and white Tshirt

[View Details](#)

Facial Recognition

Manual Search Features

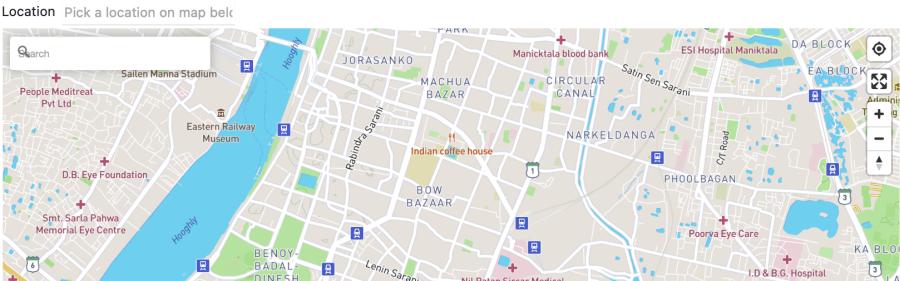
Selected PSs appear here

Belghoria : Barrackpore Police Commissionerate
Dumdum : Barrackpore Police Commissionerate
Airport : Bidhannagar Police Commissionerate

Districts	Keywords	Keyword Search Type*
<input type="button" value="Select a District"/>	<input type="text" value="Yellow T-shirt"/>	<input checked="" type="radio"/> Strict - fastest (when you are sure of the exact spelling of word e.g. "tattoo of Shiva") <input type="radio"/> Fuzzy - (Will return all approximate matches e.g. "sari" will also be returned for "Saree")

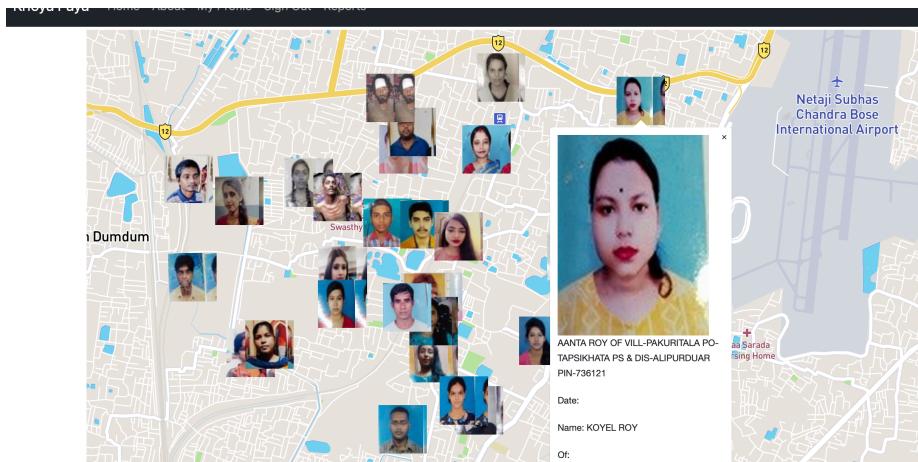
Gender	Missing or Found	Min date	Max date
<input checked="" type="radio"/> All <input type="radio"/> Male <input type="radio"/> Female	<input checked="" type="radio"/> All <input type="radio"/> Missing <input type="radio"/> Unidentified Dead Body <input type="radio"/> Unidentified Recovered Person	<input type="text" value="2023-01-01"/>	<input type="text" value="2023-02-24"/>

You can specify a lat/long and distance in Km to search for reports within a circle

Location	Pick a location on map below	Latitude	<input type="text"/>
		Longitude	<input type="text"/>
		Distance	<input type="text"/>
		Map or List	<input type="radio"/> Map <input checked="" type="radio"/> List

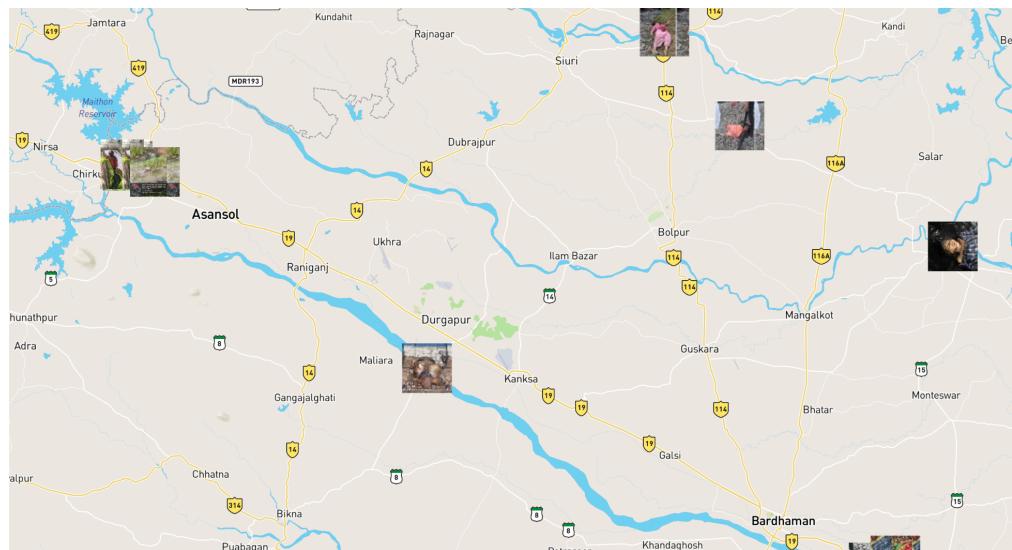
Manual Search Form

Feature 2 : Allows users to search for missing/found persons near a location

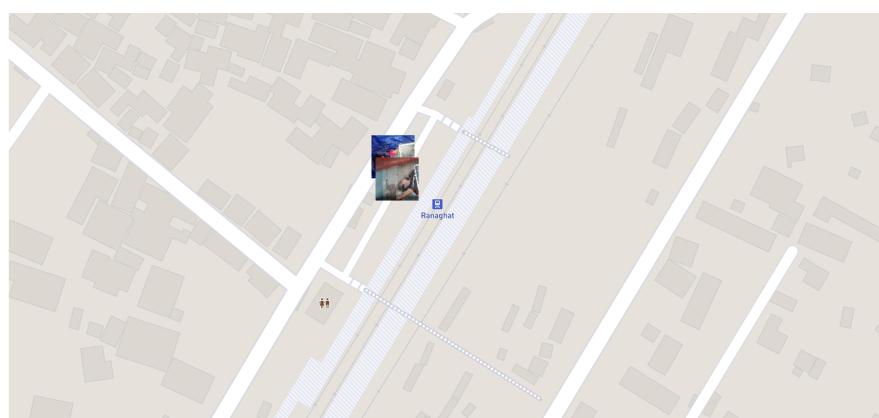


Loccation-based search

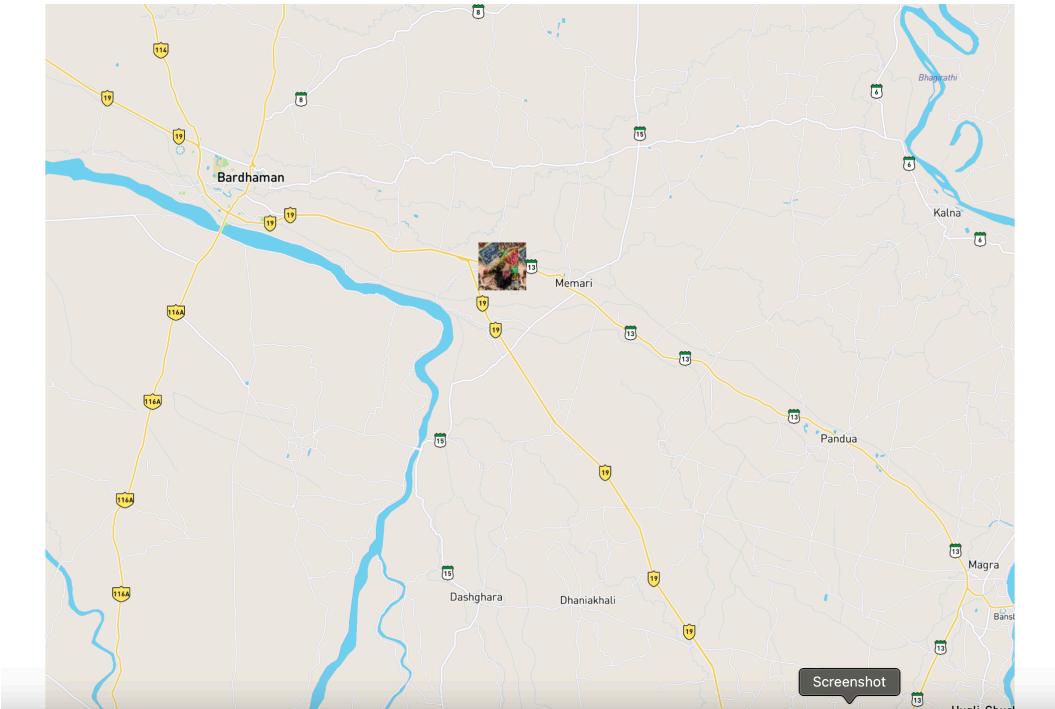
Feature 3 : Allows users to search for found persons near a river, rail-track or road in a given area.



River UIDs



Rail-line UIDs



Roadways UIDBs

Feature 4: The legacy data for the approximate period of six months preceding February, 2023 provided by SPs/CPs has resulted in 510 likely matches.

Matched Reports

[Previous](#) [1](#) [2 \(current\)](#) [3](#) [4](#) [5](#) [6](#) ... [Next](#)

Match	Missing	Found	Match	Missing	Found
	Hasena Bibi Jan. 4, 2023 Missing form Village- Boldu, PO- Kalabari, PS-Harirampur, Dist-Dakshin Dinajpur. Pln-733125 Reported By- Hasan Ali Contact No-8768507248 Complexion-Sallow, Eye-Normal,Hair- Normal Black, Face-Round, Nose- Pointed,Voice-Feminine, Weight-45 Kgs, Wearing Apparel-Blouse Sharee, Religion-Islam. Harirampur : Dakhsin Dinajpur	 Hotpot (2) - 8/29/2022 Jan. 23, 2023 (1)Sex- Female (2) Age- about 45 years (approx.). (3)Complexion:- Shyambarna. (4) Height- 5 fit (approx.). (5) Built- Medium. (6) Hair:- Black . (7) Eye- Normal. (8) Face:- Oval. (9) Nose:- Normal. ID Mark- Nil () Wearing A/P:- (i) Ghee colored, orange colored floral print top, ii) Black jeans, iii)Blue jeans jacket iv)Light blue bra.		Shikha Lohar May 23, 2022 Kalna G.R.P.S. : Howrah G.R.P.	 Unknown Sept. 26, 2022 "Built- Normal Complexion-Sallow Colour of eyes- Normal Black Hair- Normal Black, Religion- Hindu. Mother tongue- Bengali Wearing Apparels- Red & Green colour Sharri. " Patrasayar : Bankura Shibpur : Howrah Police Commissionerate

Automatic matches based on Facial Recognition

Feature 5: Allows the public to upload a missing person report online and get immediate attention of the concerned police officers.

Upload photo of missing person

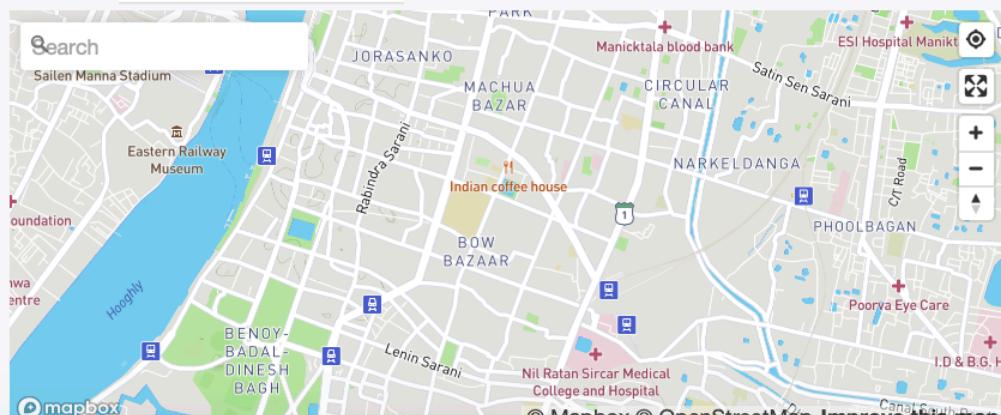
- 1) I understand that this is not a legal document. I must visit the Police Station with the token given to me and validate my input given here physically.
2) The missing person is not a minor. As per the orders of the Hon'ble Supreme Court of India, I must visit the Police Station physically to register a specific FIR if the missing person is a minor.

Acknowledgement*

Photos *	Use a clear, vertical frontal face picture.	Height in cm.*	It is very important to record height. Make a best guess by recording statements of 3/4 close acquaintances.
<input type="file"/> Choose File no file...lected		<input type="text"/>	
Missing person's phone (10 digits)		Age*	
Your telephone (10 digits)*		Description*	
Your Email*		Date of Missing*	
Gender*	<input type="radio"/> Male <input type="radio"/> Female	Captcha*	<input type="checkbox"/> I'm not a robot reCAPTCHA <small>Privacy - Terms</small>
Name of Missing Person			
Guardian name and address			
Police Station*			

You can enter location where missing person was last seen by selecting a point on the map,

Location* Pick a location on map below



Screenshot