Call for Participation – 23rd IEEE International Conference on Intelligent Transportation Systems (IEEE ITSC 2020)

UAS Collected Traffic Data Analysis (UAS4T)

Organized by: IEEE ITSS Technical Activities Sub-Committee "Transportation 5.0"

Call Description

Unmanned Aerial Systems (UAS) have started to revolutionize the field of traffic data collection, unleashing opportunities to advance the theory and practice in collecting, understanding, and modeling traffic based on large video streams. With the overwhelming amount of data being gathered by such systems, new opportunities for a detailed analysis of vehicle movements, atypical traffic patterns and multimodal interactions in urban environments are unleashed.

We are happy to announce the UAS4T Competition, which will be held at the 23rd IEEE International Conference on Intelligent Transportation Systems. This year's competition is organized by the IEEE ITSS Technical Activities Sub-Committee "Transportation 5.0".

The scope of the competition is to evaluate the accuracy of statistical or CI methods in transportation-related detection problems with specific reference in queue formation in urban arterials. The focus will be on obtaining results as close as possible to the real data. Solutions that will advance the current understanding in advanced computing, data preprocessing and traffic dynamics will be also favored. The competition is open to Teams (single participant or group of participants) that are willing to present their work at the IEEE ITSC 2020.

The competition will run in two stages: in the first stage (pre-selection), the problem will be made available via email to the registered teams and submissions will be ranked according to estimation accuracy. The top 3 submissions will proceed to the next stage, which will take place on September 23, 2020 during the IEEE ITSC 2020, where the selected teams will briefly present their work (15 minutes for each presentation). The Organizing Committee will select the winner based on four criteria: i. Accuracy (50%), ii. Degree on novelty (25%) and iii. Quality of the code (10%), and iv. Quality of the presentation (15%). The first prize is €2000. The winner will be announced during the IEEE ITSC 2020.

The pNEUMA Dataset

This competition is built on the open data initiative of pNEUMA (New Era of Urban traffic Monitoring with Aerial footage), a unique dataset that was acquired during a first-of-its-kind experiment using a swarm of drones over a dense city center. This dataset, shared with the research community, consists of more than half a million detailed trajectories of almost every vehicle that was present in the study area and can be found in https://open-traffic.epfl.ch.

Problem Description

The data that will be used for the competition will be shared with all the registered teams on August 1st. A similar dataset can already be found online on open-traffic.epfl.ch (pNEUMA sample dataset). The UAS4T Competition data will include trajectories that were monitored by one (1) single drone covering a wide area over the central district of Athens, Greece. Both major and minor roads, bus stops and signalized intersections are included in the study area. The dataset includes trajectories from cars, taxis, powered two-wheelers, buses, medium and heavy

vehicles. Participants are asked to develop a scheme to estimate the maximum length of the queues per lane that are formed for different approaches of an intersection and roads (to be specified) during the monitoring duration. Thus, for every specified area, the teams will have to report: i. Maximum length of queue, ii. Lane the maximum length occurred, iii. Coordinates of the start and end of the maximum queue, iv. Timestamp of the maximum queue occurrence, and v. whether, when and where a spillback is formed (when applicable).

Rules

- Teams (single or multiple participants) must register for the data competition through the IEEE ITSC 2020 registration platform (https://erasmus.eventsair.com/ieee-itsc-2020/reg-late) by **July 30, 2020**. Participants should choose the "One-Day Workshop Access" registration fee. At least one member of each team must register for the IEEE ITSC 2020 for the Team to be eligible to participate in the competition. When the registration is complete, please send an e-mail with the Pro-Forma provided to you on **ieee.itsc.2020@gmail.com**.
  If any of the already registered participants wish to participate in the competition, they can send an e-mail to ieee.itsc.2020@gmail.com.
- Following the registration deadline of July 30, 2020, the data will be provided to all registered teams in the form of a .csv file.
- The accuracy of the lengths, the coordinates, and the timestamp, will be evaluated in comparison with the actual values occurred.
- The final submission must include:
  - A Results.csv file including all the above-mentioned information.
  - The code, which replicates the entire procedure (data preparation and visualization, model development, testing, visualization of results, predictions extraction etc.). Code must be properly commented to allow reviewers to understand the logic.
  - A short paper (no more than 3 pages) detailing the approach used and the main outcomes.
- Allowable languages/environments: R, Python, Matlab/Octave, C, C++, C#, Java, TensorFlow, Cognitive Toolkit. Other programming languages/environments may be allowed if proper justification is provided by the Team and approved by contest committee. Approval for other languages/environments must be sought prior to the submittal deadline.
- Teams must agree to share their code using Jupyter Notebook. The code will be archived and open to public through an open project that will be created in GitHub by the Committee.

Panel Members

Dr. Wei-Bin Zhang, President IEEE-ITSS (wbzhang@berkeley.edu), Dr. Evangelos Mitsakis, General Chair IEEE ITSC 2020 (emit@certh.gr), Prof. Eleni Vlahogianni, Publications Chair IEEE ITSC 2020 (elenivl@central.ntua.gr), Dr. Emmanouil Barmpounakis, Postdoctoral Researcher EPFL (manos.barmpounakis@epfl.ch), Charis Chalkiadakis, Assistant to the General Chair IEEE ITSC 2020 (charcal@certh.gr).

Important Dates

July 30, 2020	Deadline for team registration
August 01, 2020	Data released to the registered teams
September 10, 2020	Deadline for submission of results
September 15, 2020	Notification of acceptance of top 3 submissions (Pre-selection stage)
September 20-23, 2020	IEEE ITSC 2020 (Final stage for nominating the winner)