

TU Delft Library in 1.5-m society

Problem description

The coronavirus has caused one of the biggest worldwide crises since the modern age. Many countries have taken measures to reduce the spreading of the virus. In the Netherlands the government has chosen for a so-called 'intelligent lockdown'. This means that in general people should stay inside, but they are still free to go outside, on the condition of keeping at least 1.5 meter distance from each other.

TU Delft Library is one of the main providers of study space (seats) for students and staff members. When government measures allow, this place will be reopening. It is expected that visitors should still keep 1.5 meter distance from each other. Dedicated measures should be designed to facilitate the distance keeping, and monitoring may support to evaluate the efficiency of these measures.

We have come up with four research topics related to the crowd modelling, monitoring and management for TU Delft Library in the context of the 1.5 meter society, to accommodate students and staff members in their visit to the library. These topics can be formulated as either a **Master thesis project** or an **additional thesis project**.

Assignments:

1. Simulation-based study on social-distancing measures: design measures for the library that complies with the footsteps of the Dutch government against spreading the Covid 19, assess their performance and validity using a microscopic simulation tool (e.g., Pedestrian Dynamics)

Expected products:

- Literature study on crowd monitoring and management, social distancing measures in other context
- Simulation results on the proposed measures
- Evaluation and recommendations on the measures to be applied
- Thesis

2. Field-experiment based study on social distancing measures: test the performance of applied measures on spot, using existing sensors, manual counting, and/or survey methods

Expected products:

- Literature study on crowd monitoring and management, social distancing measures in other context, crowd monitoring sensors and tools
- Performance (quantitatively and/or qualitatively) of the proposed measure based on empirical data
- Visitor experience against the measures taken
- Recommendation on the measures to be applied and improved
- Thesis

3. Field-experiment based study on behavior in the 1.5m society: use existing sensors, manual counting, and/or survey methods to investigate the behavior of visitors of the library as well as the use of the available space

Expected products:

- Literature study on walking behavior including self-organization phenomena, social distancing behavior and measures, and crowd monitoring sensors and tools
- Empirical data analyses to define basic walking , phenomena and identify influencing factors
- Formulation of walking behavior theory
- Recommendations on a model to describe walking behavior in the 1.5 meter society
- Thesis

4. Crowd management measures: based on the existing findings on the applied measures, and possible prediction of pedestrian flow states (to be developed), come up with crowd management measures (e.g., dynamic route information panel - DRIP) to improve the flow operations and safety in the library

Expected products:

- Literature study on crowd monitoring and prediction, crowd management, social distancing measures in other context
- Identification of crowd management measures
- Robustness and efficiency of the developed measures
- Recommendation on crowd management measures
- Thesis

Information:

Active Mode Lab, Transport & Planning department

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Project start: as soon as possible (as an internship with TU Delft Library)

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