Pedestrian Tracking

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GITLAB:

https://cci-git.uncc.edu/itcs-4152-5152/fall-2021/project-9-pedestrian-tracking

Data Set:

https://colab.research.google.com/drive/1i0JSPjMz4ovuZeXhhoFBkH5wmKQ7SzIA?usp=sharing

Research

Business/Customers

- **What problem will your Computer Vision solution solve, and for whom?**
    - As we very well know, accidents have become very common. Our motive here is to create a software that is beneficial for pedestrian crossing to avoid unnecessary accidents. This is for the people of Davidson County who need a software that monitors the pedestrian walks using a camera and identifies and alerts potential accidents using the statistics of previous accidents.
- **What value will it provide them? What are their pain points?**
    - Value: Outcome of this software would help to avoid accidents and hence would be an accessory for the humans to ensure safety.
    - Pain: The process of not just collecting statistics about the area but also predicting and warning the people would be a big challenge as many may just stand in the pedestrian crosswalk without crossing (just to have a chat) and a few may be intending to cross. Hence, predicting their intent would be a challenge so we must analyse their movement to know that they are going to cross the road.
- **How big is the potential market?**
    - The market for this sort of technology is super wide. This software that we are

developing can be implemented in all pedestrian crosswalks throughout the world.

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Academic Literature Review

● **What academic work is relevant to your project topic? Pick 3 papers, ask us for help if you need it.**

○ Application of Computer Vision to Diagnosis of Pedestrian Safety Issues. (Authors: Mohamed H. Zaki, Tarek Sayed, Ahmed Tageldin, Mohamed Hussein)

[https://journals.sagepub.com/doi/pdf/10.3141/2393-09]

- **Why is this work relevant?**
  This article's relevance comes from the fact that it uses computer vision to analyse the cause and frequency of many forms of pedestrian incidents including jaywalking, vehicle violating pedestrian right of way, etc. This translates directly to our project as it has a similar goal and method to achieve it.

○ Automated Collection of Pedestrian Data Using Computer Vision Techniques. (Authors: Mohamed H. Zaki, Tarek Sayed, Ahmed Tageldin, and Mohamed Hussein)

[http://n.saunier.free.fr/saunier/stock/ismail09automated.pdf]

- **Why is this work relevant?**
  This article is relevant because it uses computer vision to track the movement of pedestrians and non-pedestrians and uses that data to inform statistics on the timing of pedestrian movement, the rate at which they move, and the timing and rate at which non-pedestrians (namely vehicles) move. This will also relate heavily to our project which will endeavor to carry out similar observations of the Davidson, North Carolina streets.

○ Goal-Directed Pedestrian Prediction (Authors: Eike Rehder and Horst Kloeden)

[https://www.cv-foundation.org//openaccess/content_iccv_2015_workshops/w8/papers/Rehder_Goal-Directed_Pedestrian_Prediction_ICCV_2015_paper.pdf]

- **Why is this work relevant?**
  This article is relevant because it endeavors to predict the movement of pedestrians using computer vision technology. They achieve this by making a statistical prediction on where the person will move to based on their current position, movement, and time. This could potentially be applied to our project to attempt to overcome the random and chaotic flow of pedestrian traffic.

- What are their results and how did they achieve these results?
  They found in the data the timing of movement in pedestrians crossing the road relative to the cars distance on the road to them. The used computer vision to analyze the pedestrians and the cars that move fluently through the cross-walk as well as accidents that occurred in this same area to find the causes and the solutions

OPEN SOURCE:

● **What open source code is available that is relevant to your topic?**

○ There is a large codebase for pedestrian safety based models like
https://github.com/anjali-chadha/pedestrian-safety-computer-vision ,
https://github.com/topics/pedestrian-safety .

● **How active are the communities around this code?**

○ Not particularly active. There are a few changes and fixes made occasionally, but they are not many contributors.

 ● **What data is available for testing and/or training algorithms?**

○ Raw Data - link to the data set from our google drive(collected from various resources, put together)

INDUSTRY SOLUTIONS:

● **What companies are solving similar problems to yours?**

○ Data from sky is a company that solves such problems using AI.

Company website: https://datafromsky.com/

● It can be tough to tell exactly how proprietary solutions work, but what can you find on the internet?

○ Tracking people from video footage isn't cutting-edge technology, but prediction by sensing the movements and warning would be a bit on the harder side and there isn't a lot on the internet regarding this topic.

DATASETS:

- **Classes and Labels:**
  - ➤ The classes of the labels are
    - ➔ Crosswalk : Total crosswalk labels - 543
    - ➔ Person: Total Person labels - 388
    - ➔ Car: Total car label - 834
- **How many samples are present in the dataset?**
  - ➤ The total number of Images in our data set is 552.
- **Information about train/test split ?**
  - ➤ The data is split with 70% Training, 20% Validation, 10% Testing
    - ➔ Training Dataset: 387
    - ➔ Validation Dataset: 110
    - ➔ Testing Dataset: 55