UTSA COVID-19 AI Modeling Update (1st May, 2020)

Model 2: AI Theoretical Model: The AI approach frames a modified epidemic model as a recurrent neural network where contact rate is modeled as a function of real-time cell phone mobility data, allowing us to analyze the contributions of six different measures of mobility in the spread of the virus.

Collaborating Team (Project Alpha): UTSA ¹, SwRI ², UT Health San Antonio ³

Figure 1: Forecasting of the cumulative cases for Bexar County for four different scenarios of physical distancing. Mobility data is real-time cell phone/mobile device location for Bexar County collected from Google LLC COVID19 Mobility Data. Mobility data comprises of six categories: retail, grocery&pharmacy, workplace, parks, residential and transit stations.

Table 1: Summary of model projections for population that will be actively infectious. Hospitalization for ≈ 20% of the active cases.

<table>
<thead>
<tr>
<th>Label</th>
<th>Physical Distancing Scenario</th>
<th>Peak Active Cases</th>
<th>Peak Timeframes</th>
</tr>
</thead>
<tbody>
<tr>
<td>b</td>
<td>50% Mobility (≈ Current Mobility)</td>
<td>227</td>
<td>Late April</td>
</tr>
<tr>
<td>c</td>
<td>75% Mobility (+50% Current mobility)</td>
<td>15005</td>
<td>Early July</td>
</tr>
<tr>
<td>d</td>
<td>100% Mobility (Pre COVID-19 mobility)</td>
<td>48990</td>
<td>Early June</td>
</tr>
</tbody>
</table>

¹UTSA-Dr.Dhireesha Kudithipudi, Nicholas Soures, Zachariah Carmichael, Anurag Daram, Dr. Lloyd Potter
²SwRI-David Chambers
³UTHSCSA- Dr.Dimpy Shah, Dr.Kal Clark
Figure 2: Forecasting of active cases for Bexar County for four different scenarios of physical distancing. Mobility data is real-time cell phone/mobile device location for Bexar County collected from Google LLC COVID19 Mobility Data. Mobility data comprises of six categories: retail, grocery&pharmacy, workplace, parks, residential and transit stations. Fig 2(a): Visualization of the active cases for four different scenarios of physical distancing. Fig 2(b) on the top left is further magnified onto the active cases with mobility of 25% and 50%. The scale is reflective of this change.

**Active (Infectious) Case Count**

- **a. 25% Mobility**
- **b. 50% Mobility**
- **c. 75% Mobility**
- **d. 100% Mobility**

**Important Note:** ≈10 day latency between becoming exposed/positive confirmation (due to incubation period (≈5 days)/testing latency) are accounted in the model. Actual cases are expected to be ≈50% higher than reported. Data-driven AI models provide a window into understanding the potential impact and should be treated as a qualitative guidance due to the rapid changes associated with the data collection, testing strategies, reporting, and the virus transmission.