

CAPSTONE PROJECT IBM DATA SCIENCE

**UNDERSTANDING THE IMPACT OF VARIOUS FACTORS ON THE SEVERITY
OF ACCIDENTS**



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INTRODUCTION / BUSINESS PROBLEM

- **ACCORDING TO THE “GLOBAL STATUS REPORT ON ROAD SAFETY 2018” FROM THE WHO HIGHLIGHTS THAT ABOUT 1.35 PEOPLE AGED 5-9 YEARS HAVE BEEN KILLED IN AN ROAD TRAFFIC ACCIDENT.**
- **TO REDUCE THIS NUMBER IN FUTURE WE ARE LOOKING AT THE ASSOCIATION OF EXTERNAL FACTORS AS WEATHER CONDITION AND ROAD CONDITION OR DRIVER RELATED FACTORS SUCH AS INATTENTION AND UNDER INFLUENCE OF DRUGS AND/OR ALCOHOL.**
- **THE WHO WOULD BE INTERESTED IN THE OUTCOME OF THIS ANALYSIS TO RECOMMEND THE MOST EFFECTIVE ACTIONS TO REDUCE THE NUMBER OF FACILITIES FOR THE FUTURE IN THE US. DEPEND ON THE OUTCOME THEY WOULD BE ABLE TO DECIDE TO:**
 - ***FOCUS ON THE INFRASTRUCTURE INVESTMENT PROGRAM OF A COUNTRY***
 - ***FOCUS ON THE TRAINING AND INFORMATION DISTRIBUTION TO VEHICLE DRIVERS***

DATA WHICH HAVE BEEN USED

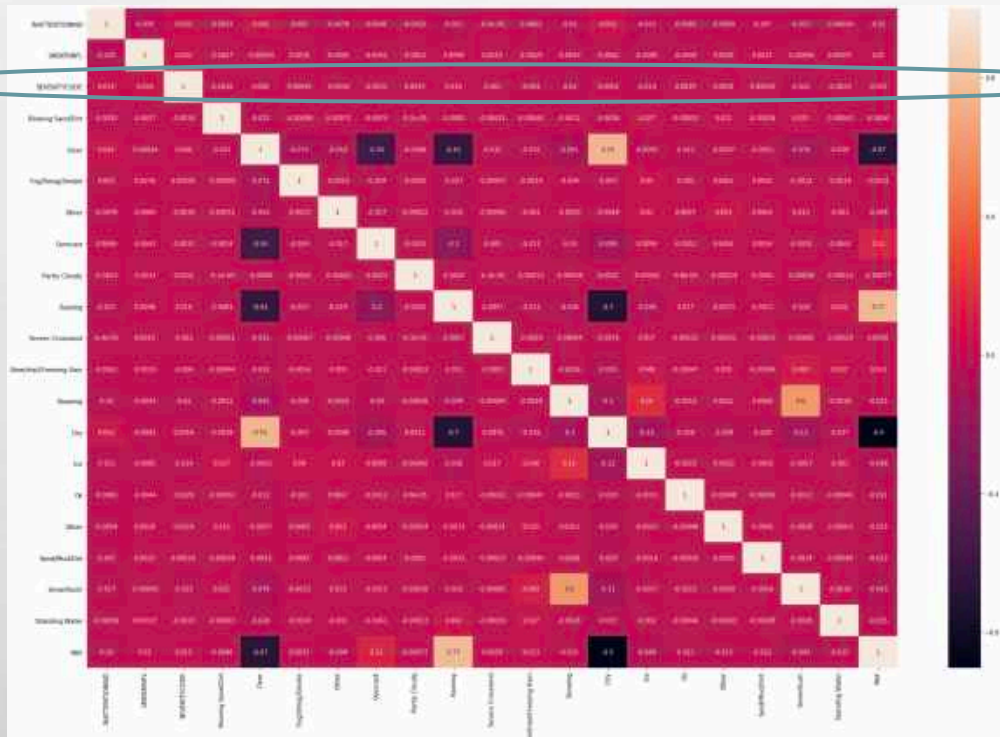
	DESCRIPTION
OBJECTID	ESRI unique identifier
SEVERITYCODE	A code that corresponds to the severity of the collision
INATTENTIONIND	Whether or not collision was due to inattention.
UNDERINFL	Whether or not a driver involved was under the influence of drugs or alcohol.
WEATHER	A description of the weather conditions during the time of the collision.
ROADCOND	The condition of the road during the collision.

- **THESE ATTRIBUTES ARE LIKELY TO HAVE AN IMPACT ON THE SEVERITY OF THE ACCIDENT. THE DATA ONLY INCLUDES COLLISIONS PROVIDED BY SPD AND THUS IN THE US, BUT THERE CAN BE VERY LIKELY GENERALIZED TO OTHER OECD COUNTRIES AS WELL.**
- **TO CONFIRM THIS, I WOULD USE SIMILAR DATA SET FROM SOME OTHER OECD COUNTRIES TO IDENTIFY, IF THE RESULT CONCLUSION WOULD BE THE SAME. THIS IS NOT PART OF THIS ASSESSMENT.**

METHODOLOGY

- **I HAVE DECIDED TO USE A CORRELATION ANALYSIS BETWEEN THE VARIOUS ATTRIBUTES AND WOULD LIKE TO UNDERSTAND THE CORRELATION OF THE SEVERITY OF AN ACCIDENT AND THE VARIOUS FACTORS THAT MAY IMPACT THIS.**

RESULTS



- **A HEATMAP HAS BEEN SELECTED TO VISUALIZE THE DATA**
- **IMPORTANT IS ONLY THE CORRELATION OF THE SEVERITY OF ACCIDENTS SEVERITYCODE IN RELATION TO ALL OTHER ATTRIBUTES.**

DISCUSSION (1/2)

- **LOOKING AT THE HEATMAP I WAS A BIT SURPRISED THAT THE CORRECTION IN GENERAL WAS NOT AS HUGE AS A I HAVE EXPECTED.**
- **THE HIGHEST CORRELATIONS (TOP 5) HAVE BEEN:**
 - 1. *INATTENTION (0.033)***
 - 2. *INFLUENCE OF DRUGS & ALCOHOL (0.033)***
 - 3. *RAINING (0.016)***
 - 4. *WET (0.015)***
 - 5. *CLEAR (0.006)***
- **WE SEE THAT – NOTING THAT ALL CORRELATIONS ARE NOT TOO STRONG – THAT THERE IS A HUGE GAP AFTER THE 4TH AND 5TH POSITION. I WILL CONTINUE ON THE TOP 4 FOR FURTHER ANALYSIS, BECAUSE I THINK THE CORRELATION IS MORE VISIBLE.**

DISCUSSION (2/2)

- **TO ANSWER THE QUESTION, IF EXTERNAL OR DRIVER RELATED FACTORS HAVE MORE CORRELATION TO THE SEVERITY OF ACCIDENTS THE ATTRIBUTES HAVE BEEN CLUSTERED IN EXTERNAL AND DRIVER FACTORS:**
 - ***INATTENTION (0.033)*** → ***DRIVER***
 - ***INFLUENCE OF DRUGS & ALCOHOL (0.033)*** → ***DRIVER***
 - ***RAINING (0.016)*** → ***EXTERNAL***
 - ***WET (0.015)*** → ***EXTERNAL***
- **IT IS VERY OBVIOUS THAT THE DRIVER IS MUCH MORE IMPACTING THE SEVERITY OF ACCIDENTS AND EXTERNAL FACTORS ARE ONLY SECONDARY.**
- **THE CORRELATION OF INATTENTION AND INFLUENCE OF DRUGS & ALCOHOL HAVE THE SAME CORRELATION, SO THERE IS NO CLEAR DISTINCTION BETWEEN THESE DRIVER RELATED ATTRIBUTES.**
- **FOR THE EXTERNAL FACTORS THERE IS A CLEAR CORRELATION OF RAINING WEATHER AND THUS RESULTING IN WET STREETS CONDITION.**

CONCLUSION

- **DRIVER RELATED FACTORS HAVE A HIGHER IMPACT ON THE SEVERITY OF AN ACCIDENT WITH INATTENTION AND INFLUENCE OF DRUGS & ALCOHOL BEING ON PAR.**
- **EXTERNAL FACTORS HAVE A LOWER IMPACT WITH RAINY WEATHER AND THUS WET ROADS HAVING THE STRONGEST INFLUENCE ON THE SEVERITY OF ACCIDENTS.**
- **AS A RESULT, WE SHOULD FOCUS ON THE 'TRAINING AND INFORMATION DISTRIBUTION TO VEHICLE DRIVERS' FOCUSING ON THESE TOPICS:**
 - ***STAY AWAKE – INATTENTION MAY KILL YOU!***
 - ***DON'T DRINK AND DRIVE***
 - ***RAINY WEATHER? SLOW DOWN!***