



UPPSALA  
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## Project in Scientific Computing 2018

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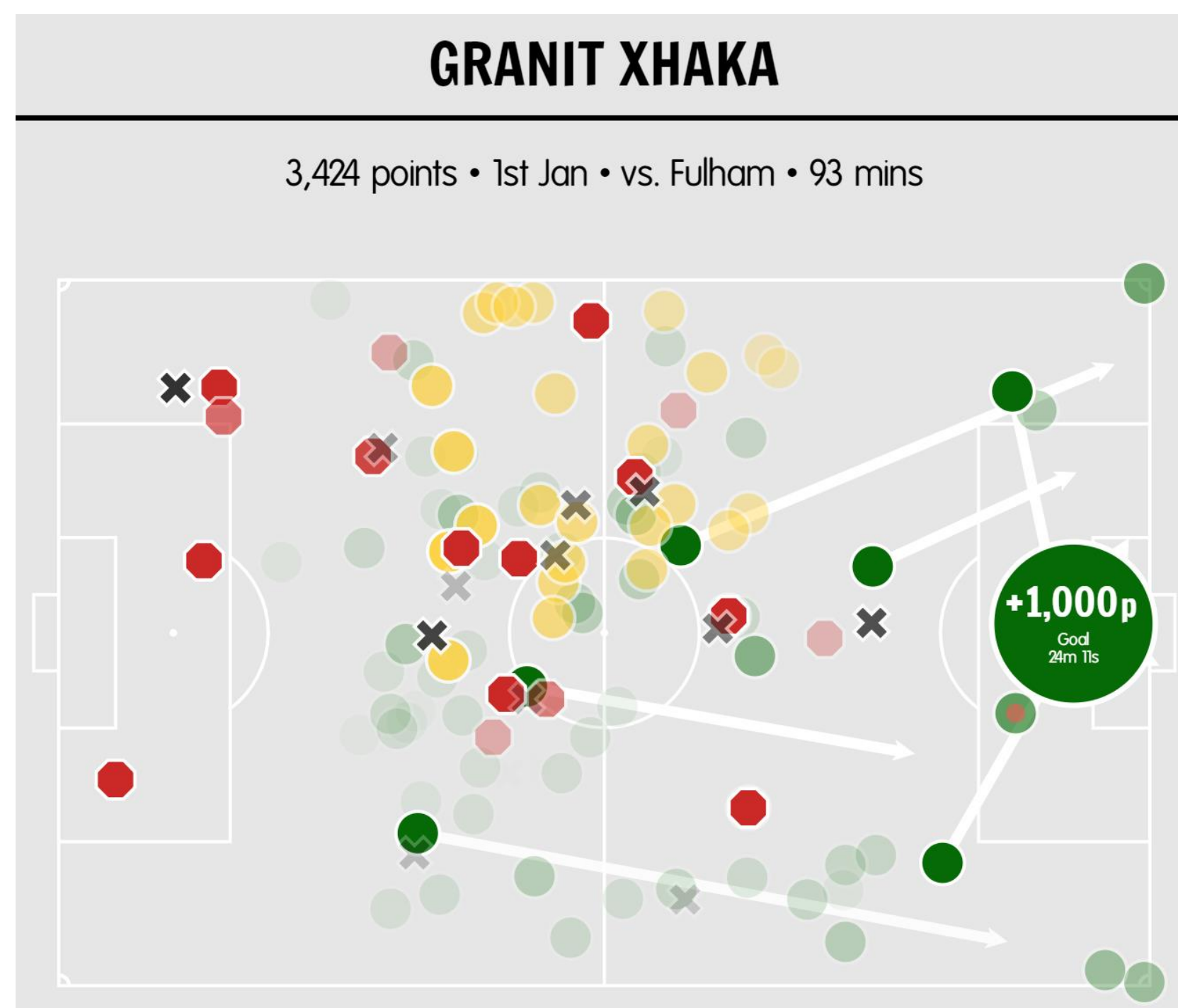
# Developing an Artificial Intelligence bot that talks about football

## Summary

We developed an AI bot that tweets and answers questions about football players. The bot communicates player statistics, forms opinions about performance and is able to compare players. The bot can receive and answer questions correctly through Twitter's messenger function.

## Introduction

There exists a number of chat bots focusing on statistics and results in the game of football. In this project we push the capability of such chat bots further. This is made possible by the company Twelve Football and their performance measuring algorithm - a point system based on how each event in a game affects the probability of scoring a goal.



Visualization of the algorithm developed by Twelve.

The visualization above shows the events of the player Granit Xhaka, divided into the weights *error*, *defence*, *attack*, *press* and *shot*. By adding the points of the events, the bot can answer opinion-based questions, such as deciding who is the best out of two players.

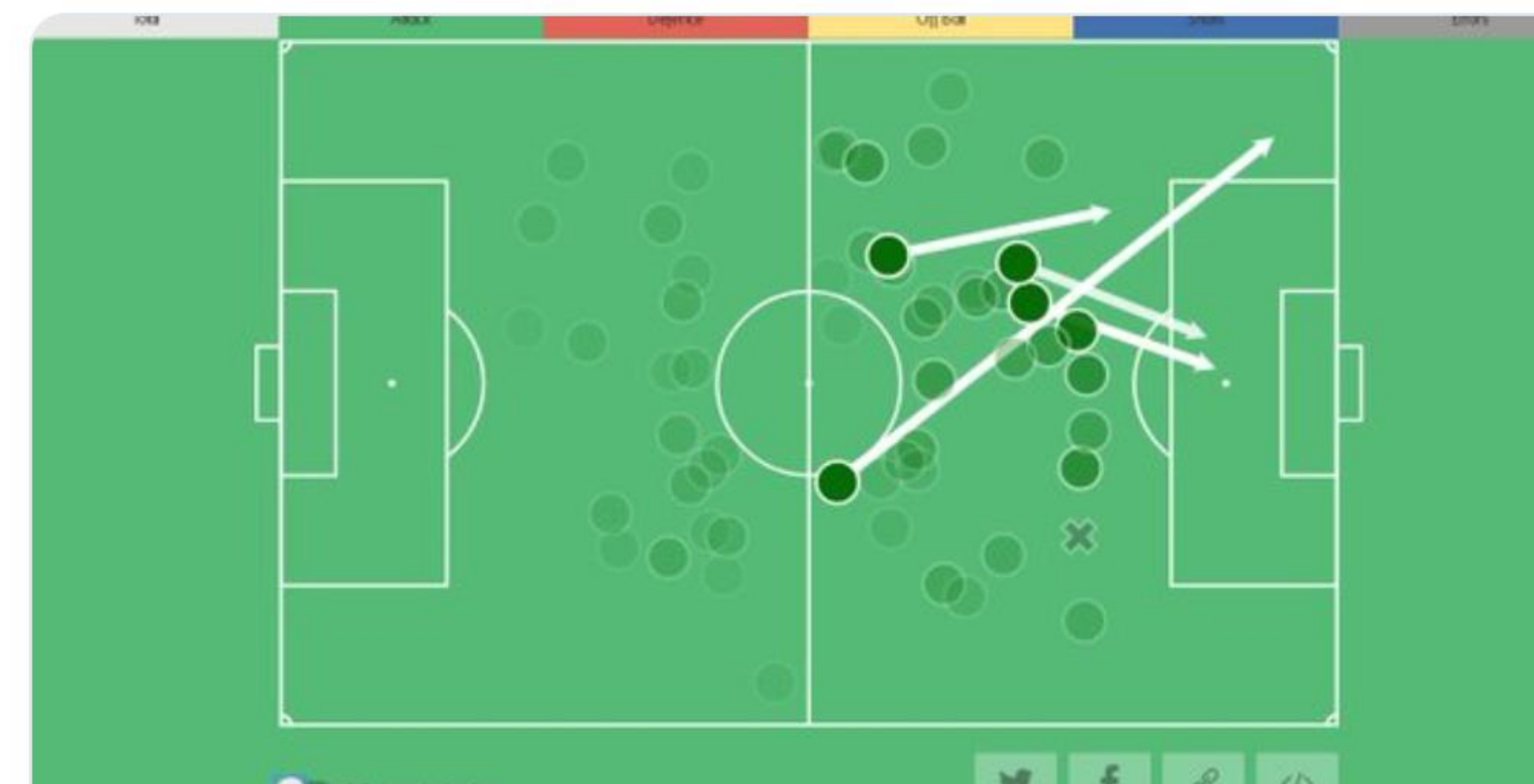
## Project goals

- Produce a large variety of interesting and correct tweets about a player.
- Answer written questions correctly on Twitter's messenger function.

## Tweets

The bot bases its tweets on Twelve's algorithm, facts and entities. Entities is where the higher level analysis of a player is done. Taking number of points in a game, as an example, we assumed a normal distribution and calculated the average number of points, using data from 750 games. Then we defined *high* performance above the 83rd percentile in the distribution and *exceptional* performance above the 95th. Following this system, we created entities covering as many aspects of the player performance as possible and connected them to a sentence building model.

Twelve @twelve\_football · 16 Dec 2018  
Fabinho contributed with 3 dribbles and supported Liverpool's attack by being involved in the build-up phase, in the match vs. Manchester United.



Twelve Player Rankings  
The data crunching football expert.  
twelve.football

Tweet produced by the bot.

In the tweet above the bot talks about the fact *dribbles* and an entity based on the location of attacking events. The facts and entities included in the tweet are decided from a system favoring exceptional entities and facts that exceed the average player.

## Answering questions

To interpret incoming questions, the bot uses the natural language processor Wit.ai. Through Wit.ai the questions are parsed into entities, containing information about the questions in terms of *intent*, *time span*, *player*, *team*, *league* and specific *facts*.

Who is the best player out of Messi and Ronaldo?

Jan 7 ✓

Out of these two players, I think Cristiano Ronaldo is the best. In the last few games, Cristiano Ronaldo has made 23 shots and has been a man of great danger in terms of finishing.

Tell me about Agüero against Liverpool.

Jan 7 ✓

I assume you meant Agüero.

Sergio Agüero was efficient in front of the goal against Liverpool and was defined by the explosion of activity in the first half.

Conversation between the bot and a user.

The first question above is parsed into the intent *compare player* and the two player entities *Lionel Messi* and *Cristiano Ronaldo*. The bot finds the players in a database and decides who is the best comparing their points over the last three games.

## Areas of improvement

- Faster replies.
- Further developed use of language.
- Higher level entities.