



Assignment 2: Report

Data Analysis and Visualisation

Experimental data analysis

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1. Introduction

The aim of this report is to implement data analyses appropriate to the domain or problem, including the research of correct measures of centre and distribution, calculation of statistical difference, testing of statistical hypotheses, analysis of variance and present a significant understanding of the cognitive principles involved in presenting data effectively and in identifying problems with visualisations.

To achieve this a task was provided that involves bar room wager about whether a rugby filled with helium could travel further than a ball filled with only air, to find out the truth of this question the rugby club formed an experiment to find out the distance differences between each type of ball when kicked.

This experiment was done outdoors on a non-windy day at the team's training area and each ball was kicked a total of 40 times by the same player and the two ball were swapped around with each kick.

These results of these kicks in terms of their distance in metres was recorded within the following table:

Kick	Air	Helium	Kick	Air	Helium
1	25	25	21	31	31
2	23	16	22	27	34
3	18	25	23	22	39
4	16	14	24	29	32
5	35	23	25	28	14
6	15	29	26	29	28
7	26	25	27	22	30
8	24	26	28	31	27
9	24	22	29	25	33
10	28	26	30	20	11
11	25	12	31	27	26
12	19	28	32	26	32
13	27	28	33	28	30
14	25	31	34	32	29
15	34	22	35	28	30
16	26	29	36	25	29
17	20	23	37	31	29
18	22	26	38	28	30
19	33	35	39	28	26
20	29	24	40	28	29

Regarding each type of ball, hypotheses were created for each in the following table:

	Null Hypotheses	Alternative Hypotheses
Air	Kicked and showed no difference in distance compared to Helium	Kicked and showed significant difference in distance compared to Helium
Helium	Kicked and showed no difference in distance compared to Air	Kicked and showed significant difference in distance compared to Air

There are however many other factors that not have been generally considered when it comes to the effects of the experiment such as wind, the amount of energy transferred into the kick (strength) etc. thus making it a rather flawed experiment however these can be fixed using a variety of solutions such as setting up the experiment within a building where no wind can enter or is sealed shut and using the same kicker for each ball while also allowing them to recover to insure consistent results etc.

2.