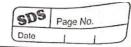
	Bayesian Computing
	Name - Breksha A. Patel
	Sapiol = 60004210126
	Branch r Computer Engineering
	Div + C2
-1	Experiment no. 98
I seek and	Ain :- To implement a model for analysis of the stanford
	Heart transplant data.
~	Thiory:
	In Bayesian Computing, the Pareto model, Laplace hit of
	metropalis, random walk are concepts that relate to
	statistical modeling, inference and sampling.
	Pareto Model:
	The Paxeto distribution, also known as 80/20 xule, is often used in
	The Parette association, and management where a small number of
	Bryesian computing to model phenomena where a small number of
	factors contribute to the majority of the observed effects.
	If is characterized by a power-low probability distribution,
	indicating that a few maxiables have a high impact, while
	other have a minimal effect, in sugaran menerally
1	Passets diet with ution might be used as a price to express
	the idea that a small supper of frederice
	laining the showed data. It is generally
	when dealing with space of as heavy - tailed distribution
	where tenditional models may not be appropriate.
	A LANGE LITE
	Laplace fit & Laplace approximation is a technique used in Bayesian
	Laplace appointments of mobality distribution with a
	Computiony to approximate a probability distribution with a
	simplete, max txactable distribution, often a Gaussian
e	(normal) distribution It is based on the each of feeting
	Common distribution to the posterior alstorbution of
	mode (peak) providing a conjunient way to reprove male the
	uncertainty around the mode
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Metropalis Random Walk of

This is a MCMC method used in Bayesian romputing for

Sampling from complex probability distributions. In metropolis

Random walk, a chain of sample is generated where each

Sample is obtained by making a random more from previous

sample and the now is accepted or rejected based on a

Certain Criteria.

Conclusion >
In this experiment, we applied Bayesian methods to the stanford heavet transplant data using Pareto distribution model. The dearn Bayes library in R was utilized for this purpose. The model parameters where estimated and posterior distributions were plotted.

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SAP ID.: 60004210126 Name: Preksha Ashok Patel

Batch: C2-1

Subject: Bayesian Computing Laboratory Semester: VII

Experiment No. 9

Aim:

Implement a model for Analysis of the Stanford Heart Transplant Data.

Code:

Importing libraries:

Library(LearnBayes)

Using a Pareto model for analyzing Stanford Heart Transplant data:

Laplace fit:

```
start <- c(0, 3, -1) laplacefit <- laplace(transplantpost,
```

laplacefit

Random walk metropolis:

```
proposal <- list(var=laplacefit$var, scale=2)</pre>
```

start, stanfordheart)

s <- rwmetrop(transplantpost,

proposal, start,

10000, stanfordheart) s\$accept

par(mfrow=c(2,2))

Shri Vile Parle Kelavani Mandal's

DWARKADAS J. SANGHVI COLLEGE OF ENGINEERING



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```
tau <- exp(s$par[,1]) plot(density(tau),
main="TAU") lambda <- exp(s$par[,2])
plot(density(lambda),
main="LAMBDA") p <- exp(s$par[,3])
plot(density(p), main="P")
apply(exp(s$par), 2, quantile, c(.05, .5, .95))
par(mfrow=c(1,
1)) t \le seq(1, 240)
p5 < -0*t p50 < -0
* t p95 <- 0 * t for
(j in 1:240){
 S \leftarrow (lambda / (lambda + t[i]))^{\land}
p q <- quantile(S, c(.05, .5, .95))
p5[j] <- q[1] \quad p50[j] <- q[2]
p95[j] <- q[3]
```

Estimating a patient's survival curve:

```
plot(t, p50, type="1",

ylim=c(0,1),
```

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ylab="Prob(Survival)",	
xlab="time")	
lines(t, p5, lty=2)	
lines(t, p95, lty=2)	

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Output:

Using a Pareto model for analyzing Stanford Heart Transplant data:

Laplace fit:

Random walk metropolis:

[1] 0.193

		[,1]	[,2]	[,3]
١	5%	0.4923842	12.81158	0.3063081
		0.9672965		
١	95%	2.0249481	63.96780	0.7425854

Estimating a patient's survival curve:

