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Juvenile Delinquency in India: Incidences and Forecasting

Prof. Jiten Hazarika, Daalima Goswami
Department of Statistics (HOD), Dibrugarh University, Dibrugarh 786004, Assam
Research Scholar, Department of Statistics, Dibrugarh University, Dibrugarh 786004, Assam

Abstract: *Juvenile in conflict with law is a matter of grave concern as this age group people belong to the most productive period of life. This phase is undoubtedly very fragile, and has severe consequences, which may last for long. The involvement of juveniles in any kind of delinquencies is indeed disheartening. There are multiple reasons, and so the nature of crime is. In this paper, it has been tried to cover the incidences of juvenile delinquencies in India for a given period of time. A detail account of such cases has been provided, giving an insight into the type of offences juveniles have been committing over the years. Moreover, an attempt has been made to forecast cases in this line for understanding future trend.*

Keywords: *Juvenile Delinquencies, Crime Heads, ARIMA, Forecasting, Incidences*

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I. Introduction

Juvenile delinquency is detrimental to every social structure. Involvement of juveniles in any kind of unlawful act is indeed unfortunate, because they belong the most productive age group of life. It is that period, which can build the future of any individual. What they learn during this time has significant impact in their future, as it is said that today's youths are the future of a nation. Therefore, instead of becoming an asset for the society, conflict of children with law is certainly a matter of grave concern. Juvenile delinquency is a result of dynamic social process and failure of both social and self-control. The intensity of delinquency depends on numerous and diverse factors like social, financial, educational, cultural atmosphere, etc. (Haveripet, 2013). The day-to-day environment, both inside and outside the home, plays significant role in shaping a child mentally and physically. Some of the most common causes, which make juvenile more inclined towards offences are identified as poverty, drug abuse, lack of education, sexual and physical harassment, abusive parents, family violence, association with anti social peer-group, etc. The causes of juvenile delinquency could be classified as (a) Social factors, and (b) Personal factors (Baligar, 2014). The social factors include influence of broken homes, poverty, delinquent companions, beggary, social media, etc. The personal factors of delinquency are mental deficiency, emotional problems, and other factors that are individualistic. Although most of studies dealing with juvenile delinquency only concentrate on delinquency by young people, however it is important to mention that they are also victim of either criminal or delinquent act. A study of 40 developing countries by WHO (World Health Organization) reveals that an average of 42% of boys and 37% of girls are exposed to bullying. Sexual harassment is a major determinant of youth violence. A study conducted by WHO on women's health and domestic violence shows that out of the total women surveyed, 3-24% women's first sexual experience was forced. It is worth to be mentioned that homicide is the fourth leading cause of death among the people aged between 10-29 worldwide, and out of which 83% are male victims. Globally around 200,000 homicides occur every year among 10–29 years of age, which is about 43% of the total number of homicides worldwide each year. Continuous threat of victimization makes youths susceptible to crime. (https://www.who.int/news-room/fact-sheets/detail/youth-violence). Sharma et al. in their review article *"Juvenile delinquency in India- a cause for concern"* shed light on the different aspect in this regard. According to this paper, Sociological theories of delinquency have categorized the factors into three groups viz. environment, social structure, and the learning process. Hirch has classified them in six groups on the basis of the kinds of offences committed. They are- Incorrigibility (disobedience and keeping late hours) , Truancy (staying away from school), Larceny(ranging from petty theft to armed robbery), Destruction of property (both public and private), Violence against community or individual, and sexual offences ranging from homosexuality to rape. Eaton and Pole classified delinquent into five groups accordingly to the offence: Minor violations (disorderly conduct and minor traffic violations), Major violations including theft, property violations, addiction, and bodily harm including homicide and rape. Trojanawicz classified them as accidental, ill socialized, aggressive, occasional, professional, and gang organized. Psychologists have classified juvenile delinquents on the basis of their individual traits or the psychological dynamics of their personality into five groups: mentally defective, psychotic, neurotic, situational and cultural (Sharma et al, 2009).

In India, delinquency is confined to the violation of the ordinary Penal Law of Country carried out by boys and girls up to the age of eighteen years. Earlier Juvenile Justice Act of 1986 was considered as model legislation to identify the juvenile delinquents. According to the Act, juvenile, in case of boy, is who has not attained the age of 16 years, or girl who has not attained the age of 18 years. The Act referred certain children as 'neglected juvenile'. Neglected Juveniles are those who are baggers, homeless, poverty driven, unruly, victimized and do not have sufficient means to live (Baligar, 2014). But the passing of the Juvenile Justice (Care and Protection of Children) Act of 2000 is a land mark in the criminal Justice system of India. This Act states that if a boy of below 18 years or a girl of below 18 years commit an offence then he or she shall be considered as juvenile in conflict with law or juvenile offender. According to National Crime Record Bureau (NCRB) of India, "Juvenile in Conflict with Law" refers to "Any person below age of 18 years who come into contact with the justice system as a result of being suspected or accused of committing crime."

II. Objective:

In this paper, an attempt has been made to analyze the detail statistics of juvenile crime in India for a certain period of time. A comprehensive account of cases against juveniles, and the nature of crime committed by this age group has been tried to explore. Descriptive statistics is used for systematic presentation of the data. Forecasting of incidences is another objective that has been carried out. Autoregressive Integrated Moving Average (ARIMA) method has been applied to meet with the purpose. The data taken for all the analysis is purely secondary and National Crime Record Bureau (NCRB) reports (www.ncrb.in) has been used for the same.

III. Methodology:

ARIMA : Autoregressive Integrated Moving Average (ARIMA) is a forecasting model of time series, which is comprised three components viz. Auto Regression(AR), Integration (I), and Moving Average(MA), symbolically denoted as ARIMA(p,d,q), where p,d,q, are the different levels of auto regression, integrated and moving average parts. ARIMA forecasts trend, by accounting the previous data of the variable. The forecasting process of ARIMA undergoes three phrases to evaluate the integer values (generally very small) of p,d,q. The middle value d is determined before p and q, to elicit the stationarity condition of the series. Generally, Augmented Dickey- Fuller (ADF) test is practiced to find out the stationary condition of the data (Tsay,2005). A stationary time series is that, which has uniform mean and variance over a period of time. If d=0 then the model becomes ARMA, and consequently it satisfies the condition of stationarity. If d>0, then the series has to be made stationary by taking the difference of the series until it becomes stationary. The stationary condition will be followed by auto-regressive component, which manifests the dependency of the series on its previous values. P=0 shows no relationship with the adjacent values. If p=1 then the neighboring values are associated at lag 1 and the respective correlation coefficient measures the magnitude of the association. Similarly if p=2 then the adjacent values are associated at lag 2, and the corresponding correlation coefficient depicts the magnitude of the association. Thus p is the order of the auto regression which is the number of the immediately preceding values based on which the future values are predicted. The next task is to find the order of the moving average i.e. the value of q. Moving average takes into account the involvement of the error terms of the previous periods on the current periods' error term. If q=0 then there is no association between the adjacent error terms. If q=1, then it shows the relationship between the adjacent error terms and the corresponding correlation coefficient shows the magnitude of the association. The process is continued until the order of q is determined which bestows the number immediately preceding error terms based on which the future values are predicted. After the determination of the values of p,d, and q, the next task is to find the Autocorrelation function (ACF), and Partial Autocorrelation Function (PACF) which the internal structure of the analyzed series. In order to acquire the best model, there are various model selection criteria are prescribed. Among these, the criteria that will be used in this study is AIC (Akaike Information Criteria), where the model with minimum value of AIC is considered to best for predicting trend. The process is further followed by model verification and forecasting.

IV. Incidences of Juvenile Delinquency under Different IPC Crimes:

The crime report of NCRB reveals that in 2018, a total of 38,256 juveniles were arrested from all over the country against 31,591 cases. Maximum number of such incidences were reported in Maharashtra (31,591 cases), which accounted for 18.61% of the total followed by Madhya Pradesh (5,232 cases) and Delhi (2,727 cases). According to the report, out of the total cases, incidences under IPC were 29,024; and 2,567 cases of SLL were registered. The all India rate of juveniles delinquency was 7.1 (per one lakh of population) in 2018. In this regard, Delhi reported highest rate (48.7 per one lakh of population) followed by Chandigarh (34.3), and Chattisgarh (19.0). In case of metropolitan cities, highest incidences of juvenile crimes were reported in Delhi (2,388 cases) followed by Mumbai (863 cases), and Chennai (502 cases). Among all the IPC crimes, highest number of delinquencies has been recorded under the crime head theft. It falls under the broad classification of

crime against property of IPC crimes. Maharashtra registered highest such cases with 1673 numbers of incidences, which accounted for 19.28% (approx) of the total followed by Delhi (1372 cases), and Odisha (795 cases). The juveniles also arrested under cases like hurt and grievous hurt significantly during the year. A total of 5,640 such incidences were registered out of which highest number of incidences were reported in Madhya Pradesh (1581 cases) followed by Maharastra (1102cases), and Chhattisgarh (610 cases). Juveniles were also found involved in heinous offences like rape, assault on women to outrage her modesty, etc. 1547 incidences of rape by juveniles were registered, and 1408 cases of assault on women to outrage her modesty were reported as well.

Table 1: Incidences by juvenile reported during 2008 - 2018 and % change based on previous year

Year	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Incidences	27082	25298	27962	31973	35861	48230	33433	35849	33606	31591
% change	-2.20%	-6.59%	10.53%	14.34%	12.16%	34.49%	-30.68%	7.23%	-6.26%	-6.00%

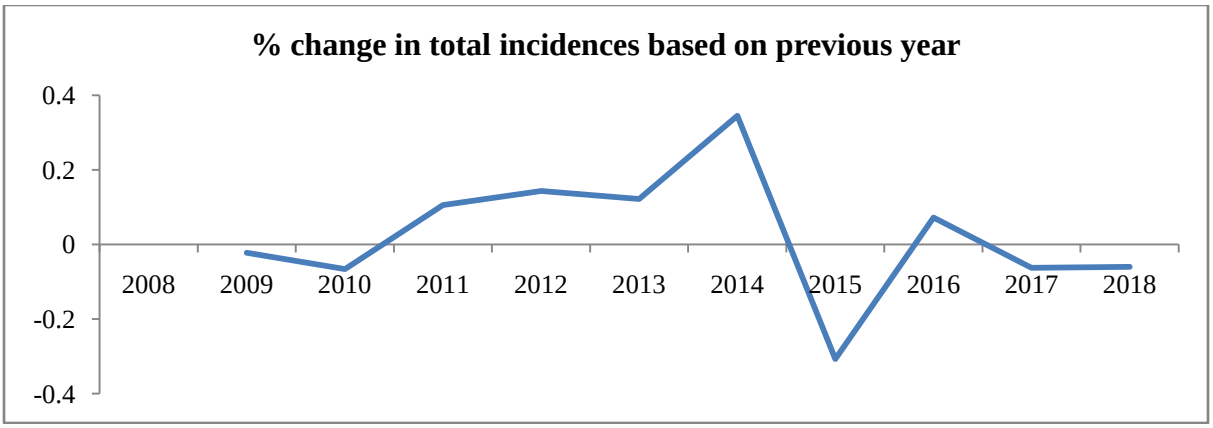


Figure 1: % change in total incidences based on previous year

A variation in incidences as well as in the rate of crimes has been witnessed over the years. In 2018, delinquency by juveniles decreased by almost 6% over the previous year. In **Table 3.1,** total number of incidences registered against juveniles and % change based on the previous year have been provided. In first two years, the growth was negative. However, during 2011 to 2014 cases soared high. As a result, an increasing trend has been observed. There was spurt in the offences during 2014. Under different IPC crimes, theft cases were highest in that year. In Madhya Pradesh, maximum numbers of such cases against juveniles were registered followed by Maharashtra and Bihar. Suddenly in 2015, incidences dropped significantly, and the rate of decrease reached edge. Although the number was more or less same as compared to other years but the % change was considerable. Total 33,433 cases against juveniles were registered, and thus the rate decreased by 30.68%, which was maximum during the period. It is to be noted that in these two consecutive years (i.e. in 2014 and 2015) maximum increase and decrease in number of cases was observed. After that, in 2016 only, a positive increase by 7.23% was observed. Since then incidences started decreasing, most importantly negative growth was observed thereafter.

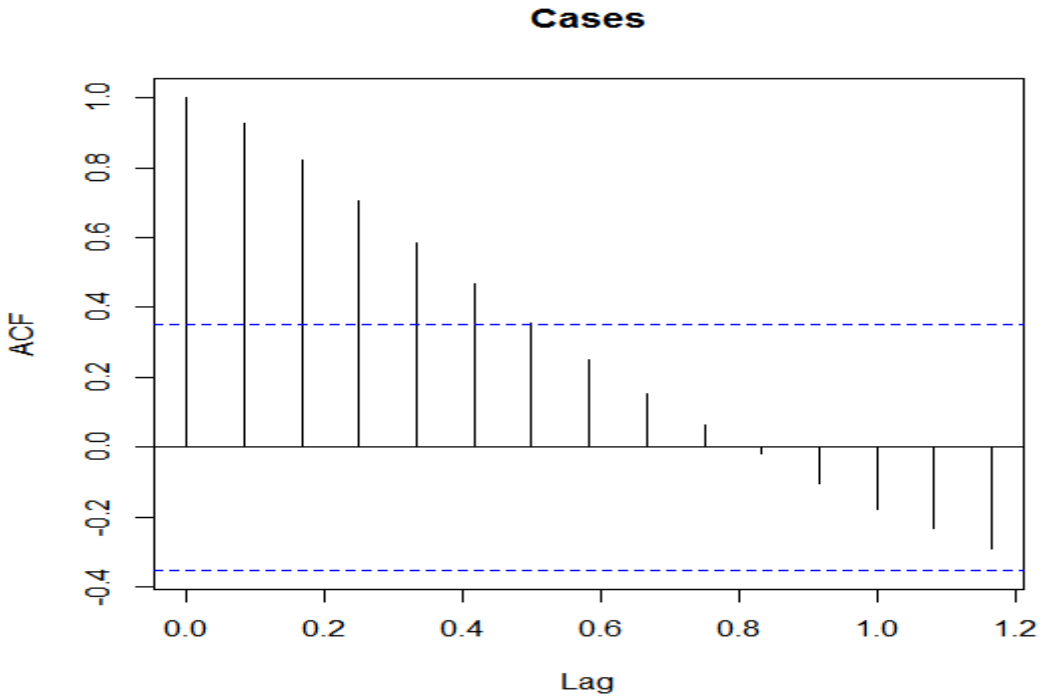
Forecasting juvenile delinquency using Autoregressive Integrated Moving Average Method (ARIMA) of order (p,d,q):

In this section, ARIMA method has been implemented for the forecasting purpose. It would help to observe the trend, and predict values. The method has been executed on the statistics of juveniles apprehended during the period 1988-2018. A long time span has been considered, as in time series analysis the period of study should be elongated enough to produce meaningful outcome. During this process of forecasting, R Programming, and SPSS have been used. After processing the required algorithm in R, the data has been converted into time series format, and plotted thereafter. It is observed from the plot that there are some outliers in the diagram **(Figure 3.8)**. It signifies the stationarity of the series. As per the conditions of ARIMA, the series now needs to be converted to non-stationary data. Therefore, these outliers have to be removed, and the stationarity test has been conducted to make the data consistent over a particular mean and variance. In the following diagram **(Figure 3.9),** the data after removing stationarity has been displayed. The data reaches stationarity at two orders of differencing.

Figure 2: Time series data of juveniles apprehended during 1988-2018

Figure 2: The data after removing stationarity

In order to find out the value of p and q, ACF and PACF have been evaluated, and displayed in terms of the following diagrams.



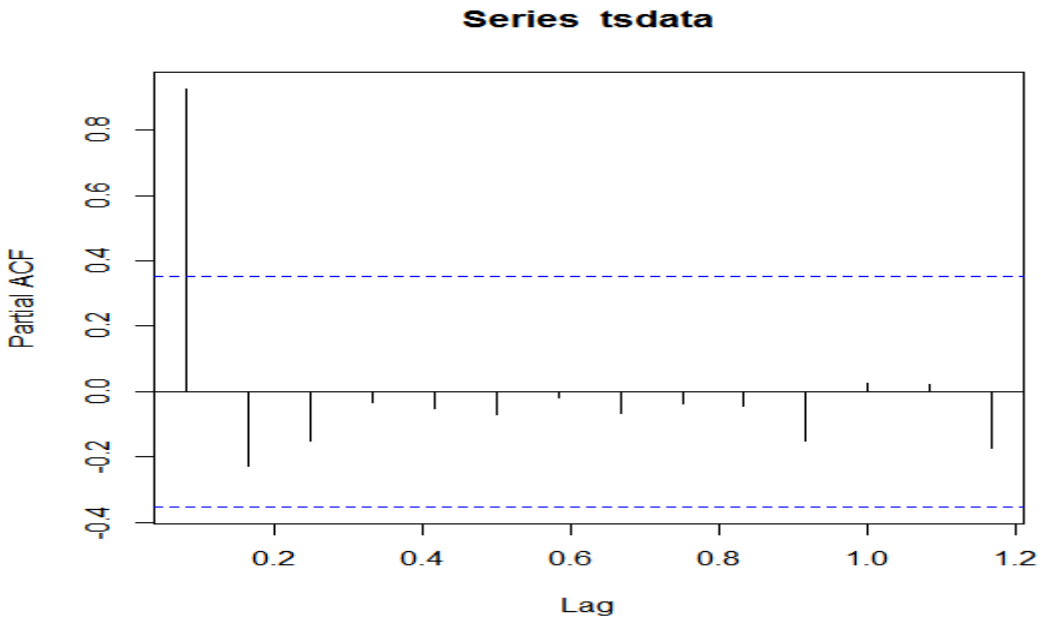
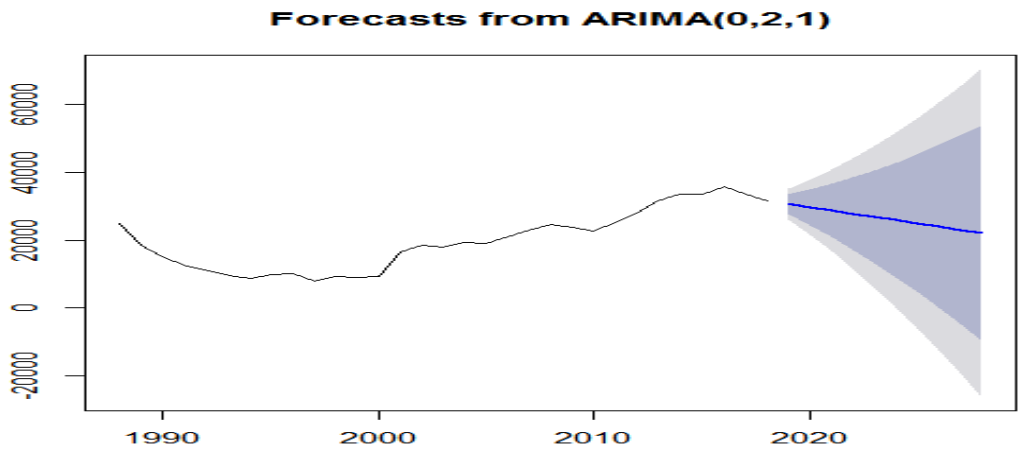


Table 2: Orders of ARIMA models and best fit

Order of ARIMA Model	AIC values	Best model
ARIMA(2,2,2)	539.3083	Best model: ARIMA(0,2,1) Coefficients: ma1:-0.5465, s.e. 0.2026 sigma^2 estimated as 5609755: log likelihood=-266.15 AIC=536.3 AICc=536.76 BIC=539.03
ARIMA(0,2,0)	539.6612	
ARIMA(1,2,0)	539.1964	
ARIMA(0,2,1)	536.7571	
ARIMA(1,2,1)	538.8946	
ARIMA(0,2,2)	538.5487	
ARIMA(1,2,2)	538.0308	



Satisfying all the conditions, ARIMA (0,2,1) fits the data best. In **Table 3.8**, all possible ARIMA models for the given data have been displayed. Among the seven models, ARIMA (0,2,1) fits more suitably than others with minimum AIC (Akaike Information Criterion). Moreover, ARIMA(0,2,1) also forecasts value for next 10 years, which is presented in the **Figure 3.11**.

V. Conclusion:

Juveniles belong to the most delicate age group of the life. During this period, they either indulge in creative work or take the path of annihilation, which may further bring threats to a nation. Therefore, as a responsible society it is a duty to keep an eye on this particular age group people, so that they could be corrected at the right time if found guilty at any point during this period. Because even a single such incidence is harmful for all in long run. This aspect should be discussed extensively to figure out the determinants, and thus try to solve them. In this paper, juvenile delinquencies in India have been covered broadly to be aware of the scenario. ARIMA has been implemented to understand the long-term behaviour of the data. The predicted values show a decrease in numbers in coming years, which is a positive aspect indeed. However, this should be kept under surveillance. The rationale behind forecasting is to adopt preventive policies in advance depending on the situation, which would be beneficial to curb such offences as much as possible.

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